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SIGNAL

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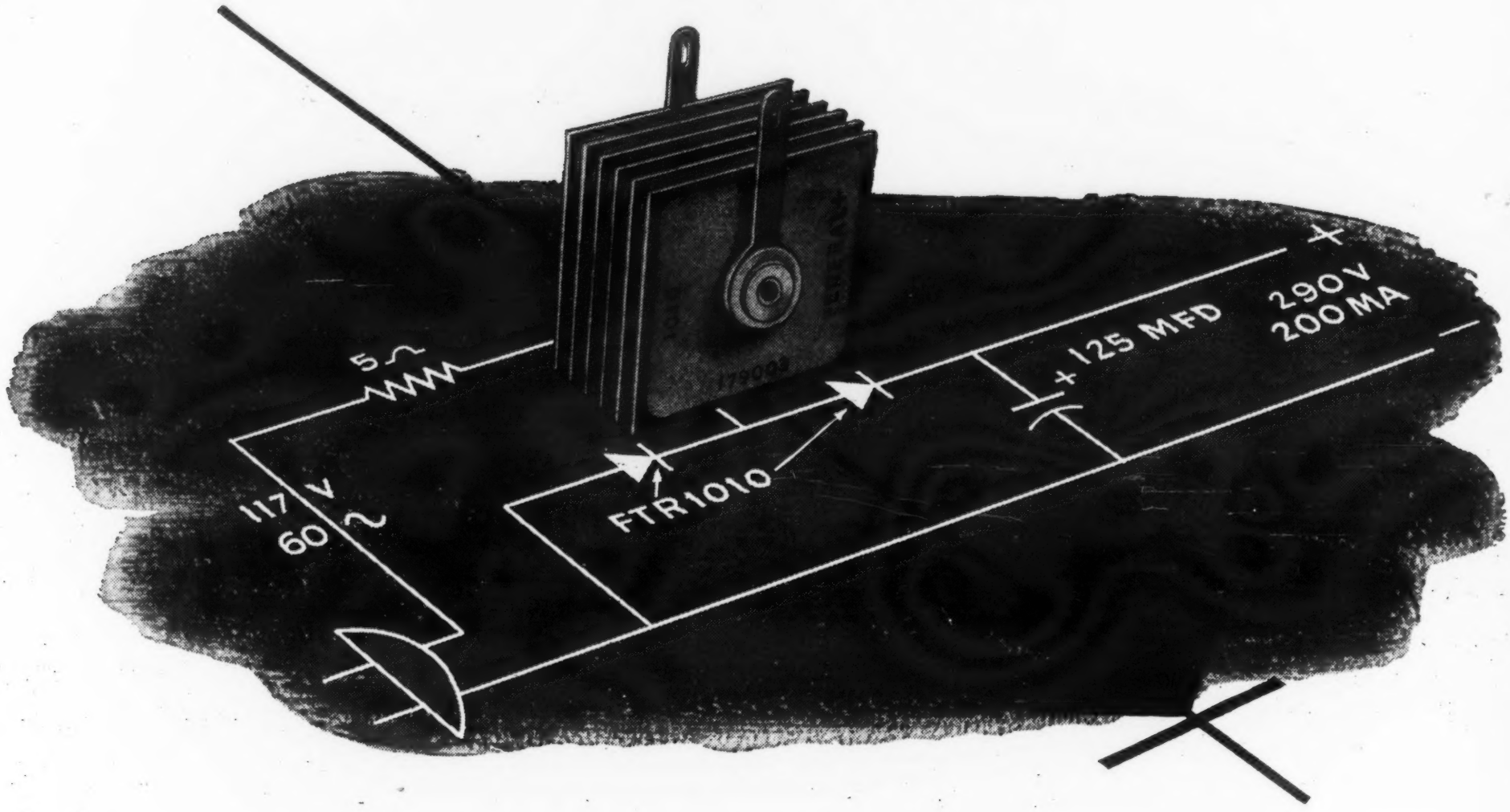

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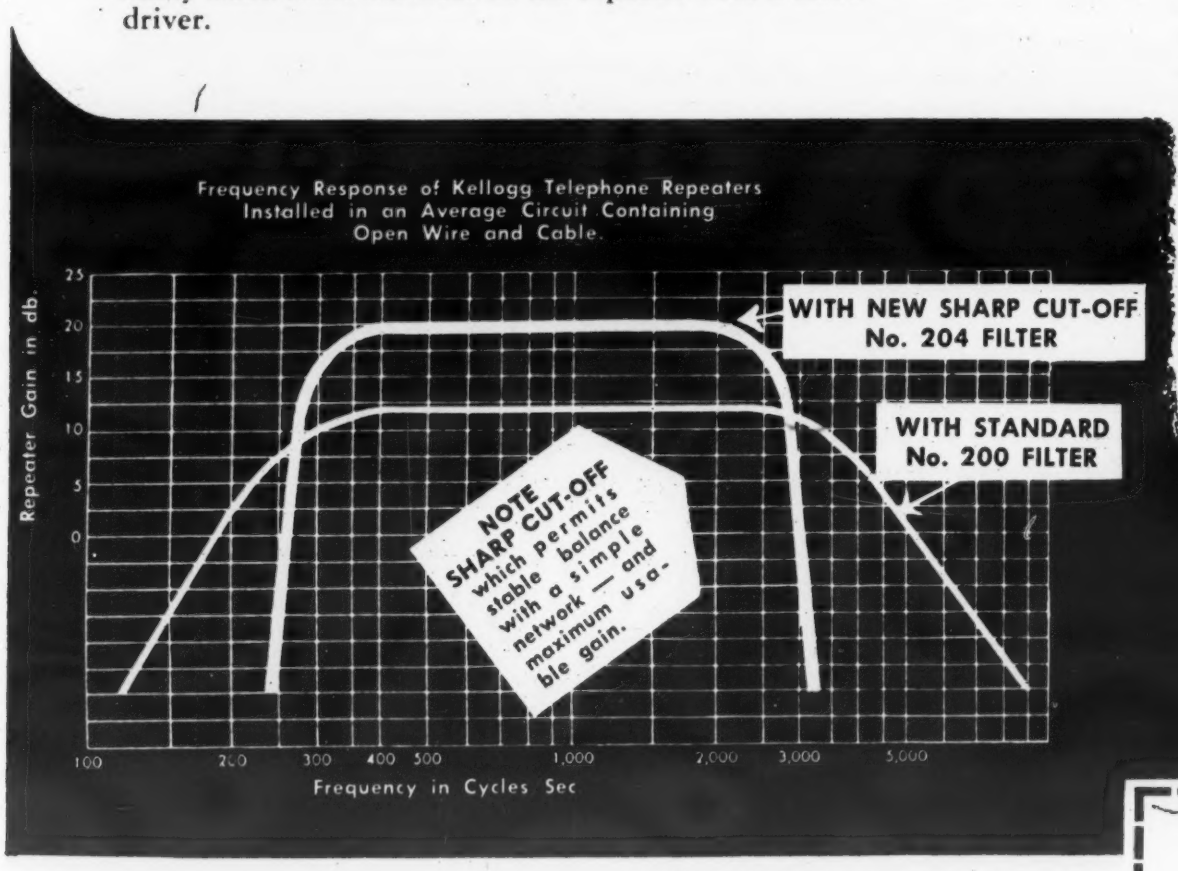

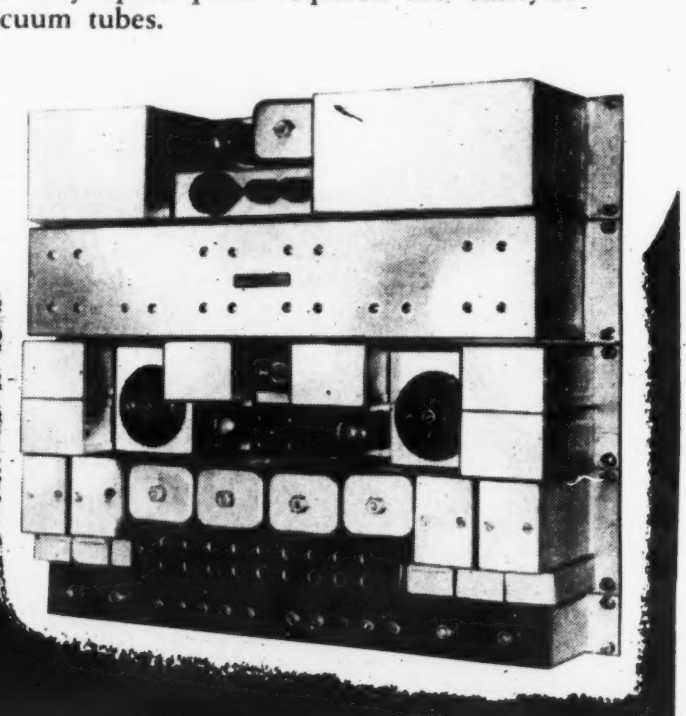

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SIGNAL

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THE COVER

The cover photo shows President E. B. Fred of Wisconsin University presenting the AFCA Medal to ROTC Cadet Robert B. Beaumont. See list of medal winners beginning page 29, and pages 31, 50, 57, 59 for other ROTC photos.

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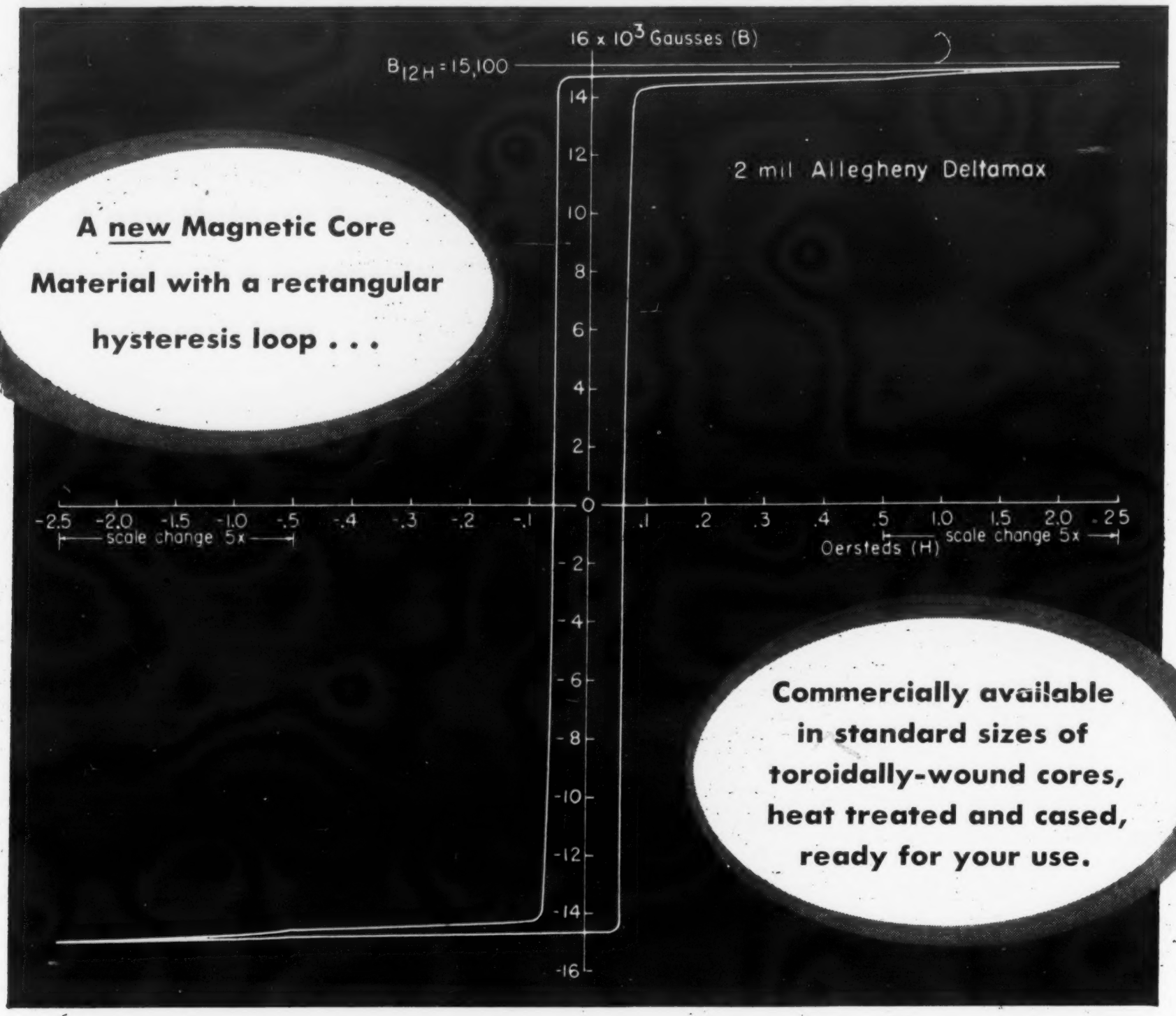

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It Captures the Present to Preserve the Past for the Future

The OPTICAL EYE of the Signal Corps

By Lt. Col. Edward C. White, Signal Corps

The activities and mission of Signal Corps photographers, and how their work affects the entire army in its present and future operations, are subjects little understood by the average man in uniform. All too often the phrase "Signal Corps Photographer" is associated with the relatively soft job of "snapping" VIP's at base headquarters. That is only a very small part of the job, which unfortunately is what strikes the public eye first. This erroneous mental picture is only corrected when one realizes that more often than not, the combat cameraman is more likely to be seen standing up while taking pictures of his comrades in arms "hitting the dirt" to avoid being hit by the enemy.

The true combat cameraman has only one idea "get that picture," and get it back all in one piece. He'll expose life and limb to get that prize shot, but that's all in a day's work. His shooting assignment is to shoot for the record rather than shoot the enemy. When the going is rough and he doesn't know whether to use a .45 first and shoot the picture afterwards, the chances are he'll shoot the picture first and then try his luck with the shooting iron. That is why thirty two Signal Corps cameramen were killed and more than a hundred wounded while trying to do their job on the Western European Front.

Surrender Epic

One of the epics of World War II is the story of the photographic officer who assisted in negotiations for the surrender of a German general and 20,000 of his men. True to the traditions of his trade he directed the surrender meeting be made at a suitable crossroads where his cameras could do the best job. Following this he dictated the contents of the surrender speech and then made a complete coverage of the whole affair with still and sound cameras. The pictorial results were a great morale booster to the American public when they saw the event on the screen and the front pages of all the papers.

Combat photographers have accompanied American troops into action on every front and in every major battle beginning with World War I. The pictures they have taken—on the ground, on the sea and in the air—have enabled our military leaders to re-design tactics and strategy, to evaluate weapons and equipment, and to plan campaigns based upon detailed knowledge of the enemy terrain, troop strength and defenses. In modern war, no military operations of any size can ever be undertaken until photographs have first been made, the results thoroughly analyzed, and plans made accordingly.

Why should the Signal Corps be responsible for photography? Is the camera a means of communication like the radio, the telephone or the telegraph? How did photography join the Signal family? Before we can answer any of these questions, we must first understand what a photograph really is.

Photography Is Communication

A photograph is more than the combination of optics, chemistry and split second exposures capturing moments of reality. The photograph is a spontaneous expression of the photographer's thoughts and feelings of his observations at the moment of exposure. Call this expression a language if you wish, because no matter what we say, we can say it much clearer if we have a picture to bring across our point. It is only when we begin to think of photography as a language that we begin to realize the importance which the photograph plays in our everyday life.

The application of this photographic language is not confined to any one sector of the universe. The world uses sixty-five principal languages and thousands of dialects through which different peoples are able to express themselves. To counteract this universal confusion, the photograph has become the common medium of expression that can be seen and understood by any nationality of people you choose to name.

For more than one hundred years the photograph has brought the different parts of the world closer together because we use it as a common tool to inform others, to express ideas and present facts. There is no place today in which this universal language cannot be used to advantage. We see its daily application in the fields of science, education, the professions and industry.

We have seen that in addition to being a language, the photograph is used to transmit ideas, facts and other information. Admiral Forrest Sherman, Chief of Naval Operations, clarified the issue when he said, "Communication, reduced to its simplest terms, is the exchange of intelligence between persons." If we recognize the truth of that statement, we see at once that photography is an important means of communication.

Increasing Electronics Tie

We cannot escape the fact that photography today is used extensively as a means of expression for all types of information. Recognition of this factor alone compels us to accept photography in the same categories of communication as the press, the radio and the telegraph. If further discussion is necessary, we can mention two recent developments in the field of communication which have effected closer bonds of kinship between photography and its parent organization. I refer to the use of facsimile equipment and television which we use as devices for the common employment of radio and photography to communicate intelligence between individuals.

Probably the best reason why the photographic function is tied in with the Signal Corps today is because of the Signal Corps' willingness in the past to adapt new developments which could have a future application in the

Combat cameramen at work, WW II. L to R: Germany, the famed Remagen Bridge; "Duck" set fire by German shells, Nettune, Italy; Jungle march cameramen accompany advance through New Guinea; BAR man covers cameraman on hill in Schonau area, Germany

fields of communications. Even today, the pioneering spirit of the Signal Corps can be seen in promoting anything that can be of value in the electronic-communications field. There are several developments employing both radio and photography that promise to play a very prominent part in the future transmission of intelligence between individuals.

On March 3 this year the Signal Corps celebrated its 87th anniversary. Let us review the progress that military photography has made during those 87 years. Photography actually came into existence more than thirty years before the advent of the Signal Corps. Daguerre was perfecting the early phases of photography about the same time that Morse was working on the telegraph.

Matthew Brady

The man to whom the nation pays tribute as being the first military photographer was not a soldier but a civilian. An Irish immigrant, Matthew Brady was the leading fashionable photographer when civil war broke out between the States. President Lincoln gave Brady permission to photograph the war and Brady received the equivalent of the present day photographer's identification card when Lincoln signed his name to a slip of paper which simply said "Pass Brady."

Brady virtually sacrificed his prosperous business to assume the role of the first combat cameraman. In his position as pictorial recorder of the war, Brady took care of his own organization, logistics, training and publicity connected with his vast undertaking. To carry out this project he paid all his own expenses. It is said that Brady at one time had as many as twenty operators in the field who worked in pairs—one doing the camera work and the other processing the negatives in their travelling dark room. The Signal Corps cameraman today has an easy job compared to those early photographers who used cumbersome equipment weighing about 100 pounds to make their negatives on heavy glass plates. In addition to making pictures under extremely awkward conditions, they sensitized and developed their negative materials right on the spot.

After four years of war Brady estimated he had spent $100,000 and today there are only about five thousand original negatives to show for that money. As one of the first individuals to recognize the historical aspects of the photograph, Brady directed his war negatives be made in duplicate. One set of negatives was eventually sold at auction to the War Department for $2,840, which was an historical bargain when we consider that the cost to Brady for each negative was approximately twenty dollars. Congress later appropriated $25,000 for him as additional payment for the War Department collection. Even at that figure the nation obtained a bargain when we think of the incalculable cost of documenting four years of World War II.

Following the Civil War, the Army all but forgot photography until 1881 when Adolphus Greely, then Chief Signal Officer, who was interested in photography, made arrangements to photograph his Arctic expedition. A civilian named Rice was given the rank of sergeant to become Greely's official photographer for the enterprise. Rice lost his life on the trip but General Greely saved the photographic records and brought them back to Washington in 1883.

Upon his return, General Greely persuaded the War Department to establish a photographic laboratory at Fort Myer, Virginia, then known as Fort Whipple. Photography was included as one of the courses in the Signal Corps school located on that post. The first Army manual on photography was written by a Signal Corps lieutenant in 1896, even though photography still had no official sanction within the Army.

First Issue

The first record of cameras and photographic equipment being issued to Signal Corps companies was during the Spanish-American War. Men given camera equipment were assigned photographic missions as additional responsibilities to their regular duties. At the turn of the century photography was still considered in its infancy, but about 1903 the Chief Signal Officer ordered twelve field units equipped for recording historical events with the camera.

The first record of the Signal Corps making motion pictures occurred in 1909 when the Wright Brothers made their historical flight demonstration for the Army at Fort Myer.

The Signal Corps continued to advance photography in the Army, and as a result of these pioneering efforts the camera was finally recognized as a means of communication as well as a potent military weapon. In August, 1917, the Army saw the need for putting photography on an official status. A photographic division was organized under the Chief Signal Officer. Selected men were trained as specialized photographic officers for the first time. Three training schools were opened and by the end of the first World War, 54 officers and 418 enlisted men had been given specialized training in photography.

Col. Charles S. Stodter, Director of Army Pictorial Service.

Photography in past wars. . Top to Bottom: The first combat cameraman, Matthew Brady; Scene in Cuba, Spanish-American War; A photo team in France, WW I; and photographers ride to front, also WW I, atop a tank.

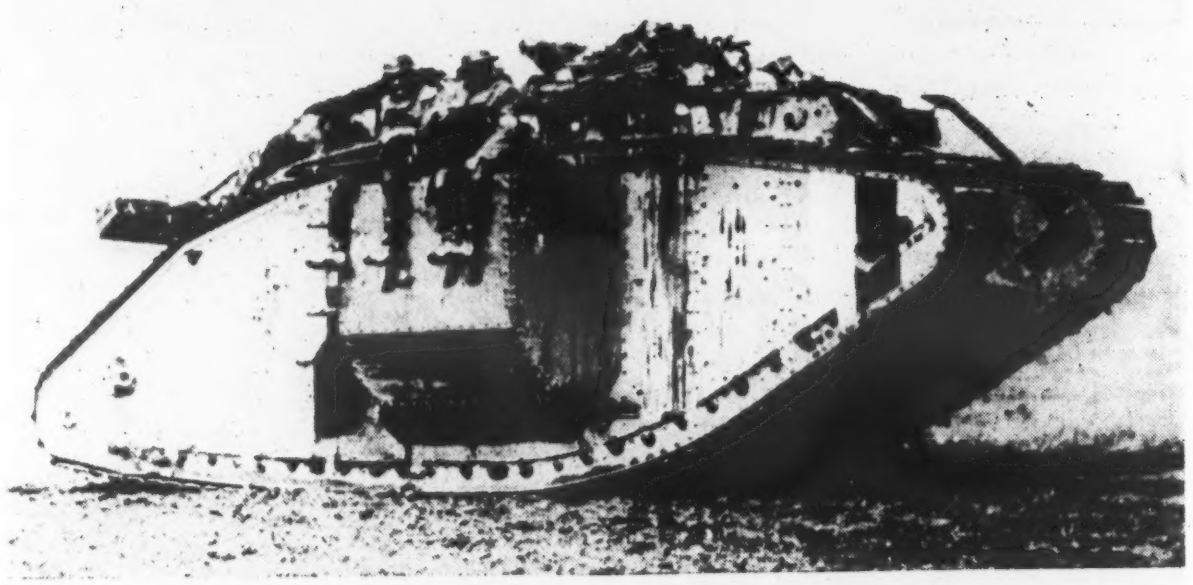
The result of Signal Corps efforts to promote photography in the Army from the Civil War down through to World War I has brought about a valuable collection of photographs depicting American history. Until they were turned over to the National Archives, the Signal Corps had in its possession the Brady collection of Civil War pictures, the pictorial survey of Greely's Arctic Expedition, an assortment of pictures of the old West donated by former Indian fighters and coverage of such subjects as the testing of the Wright Brothers' airplane, the Boxer Rebellion in China, the Spanish-American War and the Russo-Japanese war. The latter group contained several pictures taken by a young military observer named John J. Pershing. World War I produced about 97,000 still pictures and about five million feet of motion pictures, most of which now repose in the Archives.

The Combat Photo Team

To get the picture of Signal Corps photography in World War II, let us examine the operations of a typical combat photo team. The ideal operating strength of this unit was one officer and five men. The two still men in the team were equipped with 4x5 Speed Graphics, the two movie men generally had 35mm Eyemos. The fifth man served as a utility man and caption writer. He was armed with a submachine gun, while the cameramen carried either .45 automatics or carbines depending on the theater in which they operated. The officer directed the team and frequently shot pictures himself. These units were often made self-sustaining to the extent of packing about 30 days' field rations.

The mission of this unit was to provide complete still and motion picture coverage in the combat area. The type of pictures made were many and varied. They were called upon to photograph everything the commander considered important to the conduct of military operations. No assignment was too tough nor was any consideration given to physical hardships. The possibilities for the best pictures could be found only in one place—where operations were most active. By going into action alongside the man shooting the enemy, the combat cameraman risked his life to shoot for the record. Ever mindful of their task, they paraphrased the Signal Corps motto to "Get the picture through."

The photographic contributions of this team and 1,400 additional combat cameramen are far more eloquent than



New Signal Corps combat camera. Fully automatic, with interchangeable lenses, it has high speed operation, and is constructed ruggedly enough to withstand heat, cold, and rain. Utilizes 70 mm perforated film and has a film transport to permit shooting at a rate of a picture a second.

thousands of volumes that could be written on their combined activities. Their daily efforts poured into Washington at a rate exceeding 5,000 still negatives per month, and were still arriving in such numbers more than a year after the war ended. The end result, producing a file of more than 500,000 still negatives, is a composite picture of military history, the greatest the world has ever seen.

Equally, if not more impressive was the flow of motion picture footage from the fighting fronts to the theater screen. Today there are forty million feet of motion pictures made by combat photographers that produce a cross indexed file of 14,000 military subjects which yield a vivid documentation of World War II. The military importance of this vast photographic record is tremendous. The whole pattern of the war is captured and recorded on millions of tiny frames of film which expresses more than any other medium the "Blood, Toil and Sweat" history of a nation at war.

Many Applications

We must not overlook the work performed by the Signal Corps in its V-Mail operations. Practically an unknown factor before the war, the V-Mail and microfilming operations were very important in maintaining morale of the fighting men and in drastically reducing critically needed cargo space which could be applied to other purposes.

Photography has so many applications and values for the army that it is difficult to apply any yard stick for measuring its worth. Results are more or less intangible because the photograph, unless it is made as a tool for the examination of facts, is an abstract aid which almost defies evaluation in tangible terms.

We know that the total effect of pictures, as concentrated in a well-produced movie, is capable of terrific impact on the minds of men. Sometimes, one single picture will capture the imagination of a nation. An outstanding example was the picture of Old Glory being raised in battle on a hill in Iwo Jima. After months of sustained tension and uncertainty, this picture did as much, if not more, to express the national feeling that the end of the Pacific War was in sight.

The greatest value that photography has for the Army today is its application to training the American soldier to be psychologically and technically prepared for war. Technical proficiency is achieved only through practice but the photograph is unexcelled as an aid in teaching correct practices to reduce the time required for proficiency.

The psychological aspects of modern war can easily undermine a commander's plans unless his troops have been oriented, and understand the background of why they are fighting. Without a clear understanding on the part of all troops about the causes of the conflict, the nation's efficiency to wage effective war can be impeded to a dangerous point. The "Why We Fight Series" produced in the past war did an excellent job in promoting deeper understanding of why Americans had to fight.

Educational Use

On the theory that the best soldier is an informed soldier, the defense forces have gone into the educational field on an unprecedented scale. The armed forces today constitute a larger educational institution than all the combined American colleges in 1939. New discoveries and inventions have brought the military forces into a vastly increased field of learning. Scientific progress which is continually changing demands that human intelligence keep pace with the change. To meet this requirement, our military education

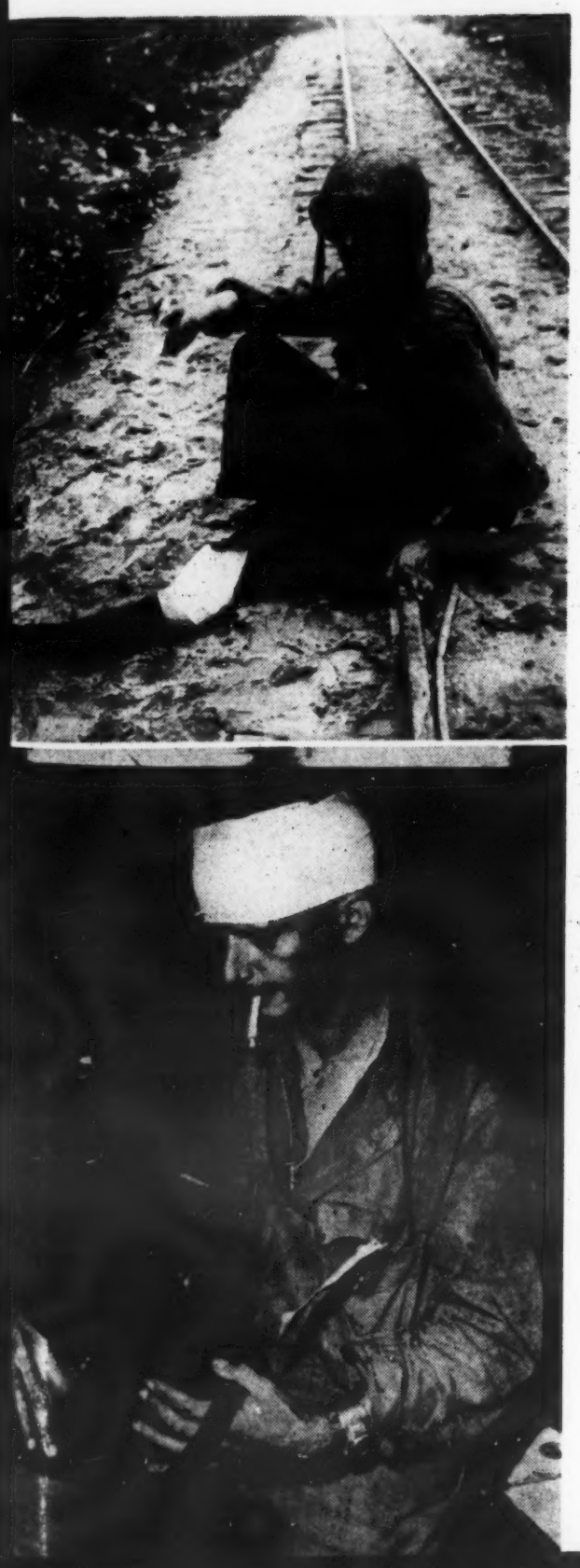
It's not all in the taking. Photos must be developed and printed too, wherever the Army is. Printing depicted below is being done at Kunming, China.

must be kept progressive so that our learning will keep abreast of today's fast-changing developments. To help attain this goal, there is no better means than the camera to enrich our learning and increase our intelligence as we meet the challenge of our changing times.

Public Information Aid

Photography is of great value to the Army in the field of public relations. Whether the nation is at war or at peace, what concerns our citizen army also becomes a matter of concern for the public. Thus, in peacetime, the camera is used to record the state of the nation's defenses, in which the public and industry are vitally interested. Industry's ability in war time to back up the soldier is dependent to a large extent upon the morale of the civilian worker. The need for informing the nation on the state of its military progress continues in actual war on a much larger scale. The civilian on the home front, unable to visualize the shooting front is under a different tension than the soldier. Their civilian tensions from unsatisfied anxieties which can only be relieved if they can be made to feel the war as real. The use of pictures is a most significant factor in promoting that reality.

The Army Pictorial Service wins "Oscars" too, Examining the Oscar here, awarded for the film "Toward Independence" are Dr. E. M. Gunn, Army Institute of Pathology; Col. E. E. Vogen, MED, Maj. Gen. R. W. Bliss, Surgeon General; and Maj. S. B. Akin, Chief Signal Officer.



Combat cameramen get killed and wounded —32 killed and over 100 wounded in the ETO alone during WW II. Upper photo, cameraman with shattered leg in Saipan. Lower, Photographer checks his equipment preparatory to returning to front line after having head wound dressed.

Another application of photography in the army can be found in the fields of research. Previous concepts of warfare are no longer recognized and the camera has become a valuable tool for science in the development of new ways and means to combat a potential enemy.

Photography has yet another use for the Army in its reconnaissance value for the front line commander. In the past war, liaison planes were used only to a limited extent for reconnaissance photography of enemy lines. Fast flying jet planes and defensive measures forcing them to seek higher ceilings will increase the need for front line commanders to use low ceiling, highly maneuverable planes to photograph immediate enemy positions, gun emplacements, personnel movements and supply dumps. Future developments along these lines will be further strengthened with the application of cameras that produce the finished print within a matter of seconds after the picture has been made. The finished print when dropped on the command post from the air has immediate value for the commander in his tactical plans.

Another aspect of photography which finds its place in the army is the use of the camera as a recorder of historical facts. The pictorial record of World War II is used every day for the examination of the past in preparing plans and actions for the future.

The Signal Corps is responsible for the biggest photographic job the Army is required to perform. Briefly, the responsibilities of the Chief Signal Officer may be outlined as the coordination of all ground photographic activities not specifically charged to any other military agency. These responsibilities cover research, development, standardization, procurement, storage and issue of photographic equipment and supplies for general army use. Other responsibilities include the procurement, supply and distribution of photographs and motion pictures for general military use, and the establishment of photographic laboratories and facilities for processing both still and motion pictures. Let us see how some of these responsibilities are being carried out.

New Developments

In the research field covering photographic equipment, the Signal Corps Engineering Laboratories are continually working on new developments based on experiences gained in two major wars. A recent example is the development of a light, durable, automatic combat camera designed for high speed operations in the field under any climatic conditions. This equipment, an adaptation of a captured Japanese camera, is capable of making a 2¼ inch square picture at the rate of one every second, or almost as fast as the cameraman can trip the shutter. Its versatility is increased with the use of a range finder coupled to any of the three lenses which are component parts of the camera.

Another development which raised eyebrows was the recent announcement that Signal Corps engineers had perfected a high speed lens with a possible aperture as large as f/0.6. This lens, producing an image about two thirds as bright as the object, is eleven times faster than an f/2 lens which is considered extremely fast for candid cameras.

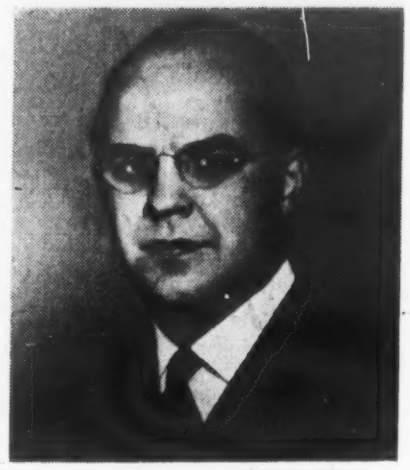
Another significant development exploited by the Signal Corps was the radio transmission of a color photo showing the Big Three meeting at the Potsdam Conference. Previous to this event the Signal Corps had serviced for publication thousands of black and white radio photos, but this was the first record of radio being used for the transmission of news color photo.

Staff responsibilities for the coordi-

(*Continued on page* 60, *col.* 1)

From the President

In his first message to the members on this page, the AFCA's new president, Theodore S. Gary, points out that in the present emergency the worth of the Association's purpose has been vividly manifested, but that we must continue to further prove that worth by renewed effort.



Against the background of events of the past few weeks, the foresight of my predecessors and their associates in establishing the Armed Forces Communications Association now stands out in sharp relief. The emergency for which they organized the Association, fostered its growth, and expanded its influence, is now a reality. If they could have foreseen the present crisis in all its tragic detail and dramatic unfolding, they could scarcely have done more than they did.

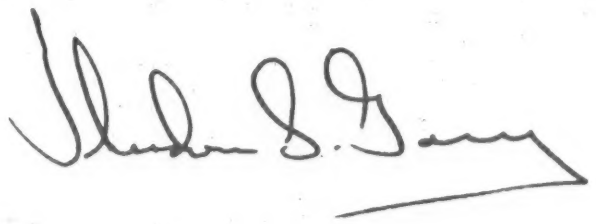
This Association, composed of alert citizens, both military and civilian, and industrial and engineering enterprises dedicated to the most effective use of military communications, electronic and photographic equipment and techniques, is now an active, smoothly functioning organization. Its growth and development, both in individual membership and in Chapters, have been little short of inspiring. This, its official magazine—the only one of its kind in existence—is proving an effective expression in print of the Association's policies and progress. Thus the groundwork for future action has been laid, and what has so far been done represents a saving of vital time.

But this is no time to rest on past achievement. It is a time for action, for unity, and for high resolve. It is our responsibility, both as individuals and as an organization, to do everything in our power to implement the policies of the Government as set forth in the commitment made by the President of the United States to the Congress at the time of the invasion of South Korea by the Red forces.

The task that lies ahead of us is large, and it will take the coordinated efforts of all of us to meet the challenge, not only of the immediate future, but also of the long and uncertain years ahead. It has been said that our greatest need is manpower—more and more manpower. We know that is true; but we also know that the effectiveness of manpower can be greatly multiplied by the increasing use and improvement of our facilities for communication, and its allied sciences in the electronics and photographic fields. The truth of this has already become manifest in our military operations in Korea; but it is also true in our expanding preparations at home and in the integration of our military and civilian operations.

In our techniques in these various fields, we are already well ahead, but we cannot afford to relax our efforts, for to stand still means to go backwards. We must see that progress, both in technical development and in practical production, continues at the highest possible level. We must see that the various departments of the Government are kept advised of our progress and our abilities to meet whatever challenge the future may impose.

I am confident that every individual and every unit of the Association will keep these thoughts in mind in their daily efforts, and in their dealings not only with the armed services, but also with each other, so that the ideals and objectives for which we live can be preserved.



photos

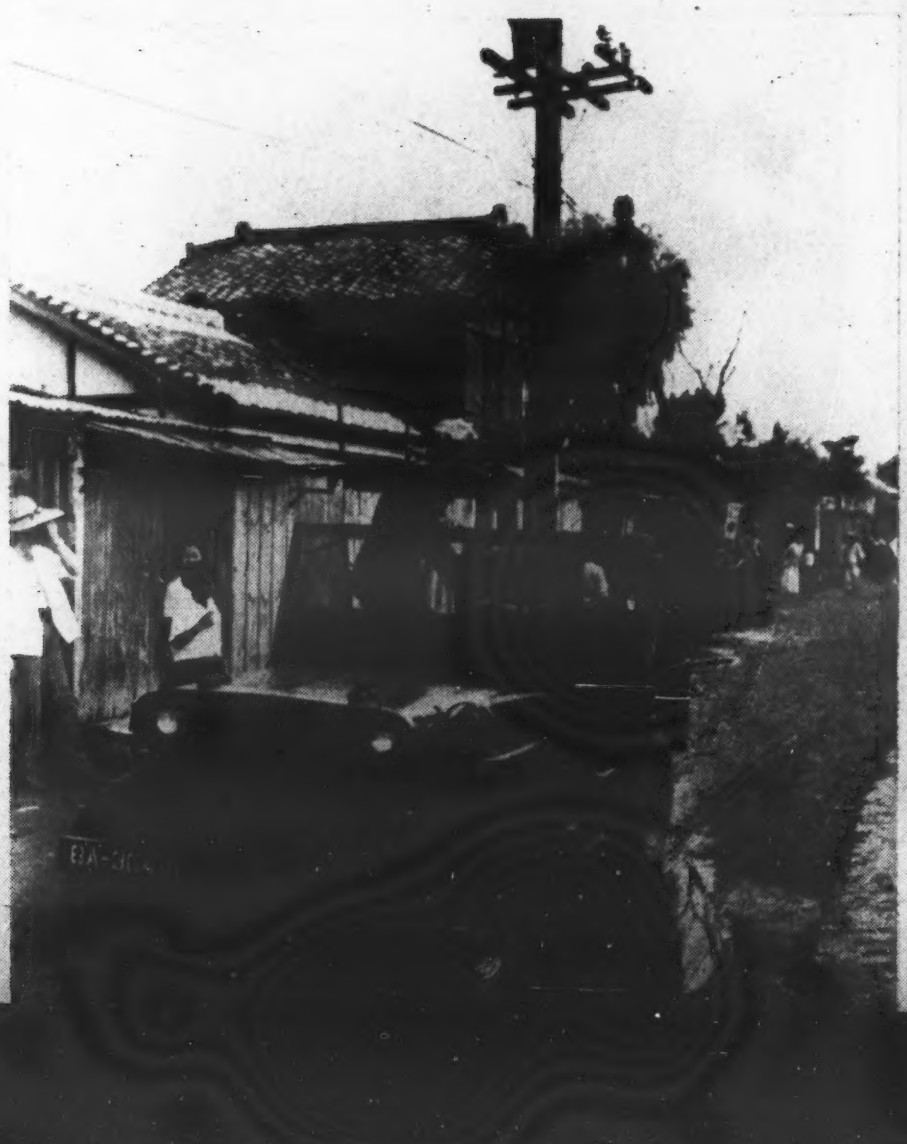
Somewhere in Korea

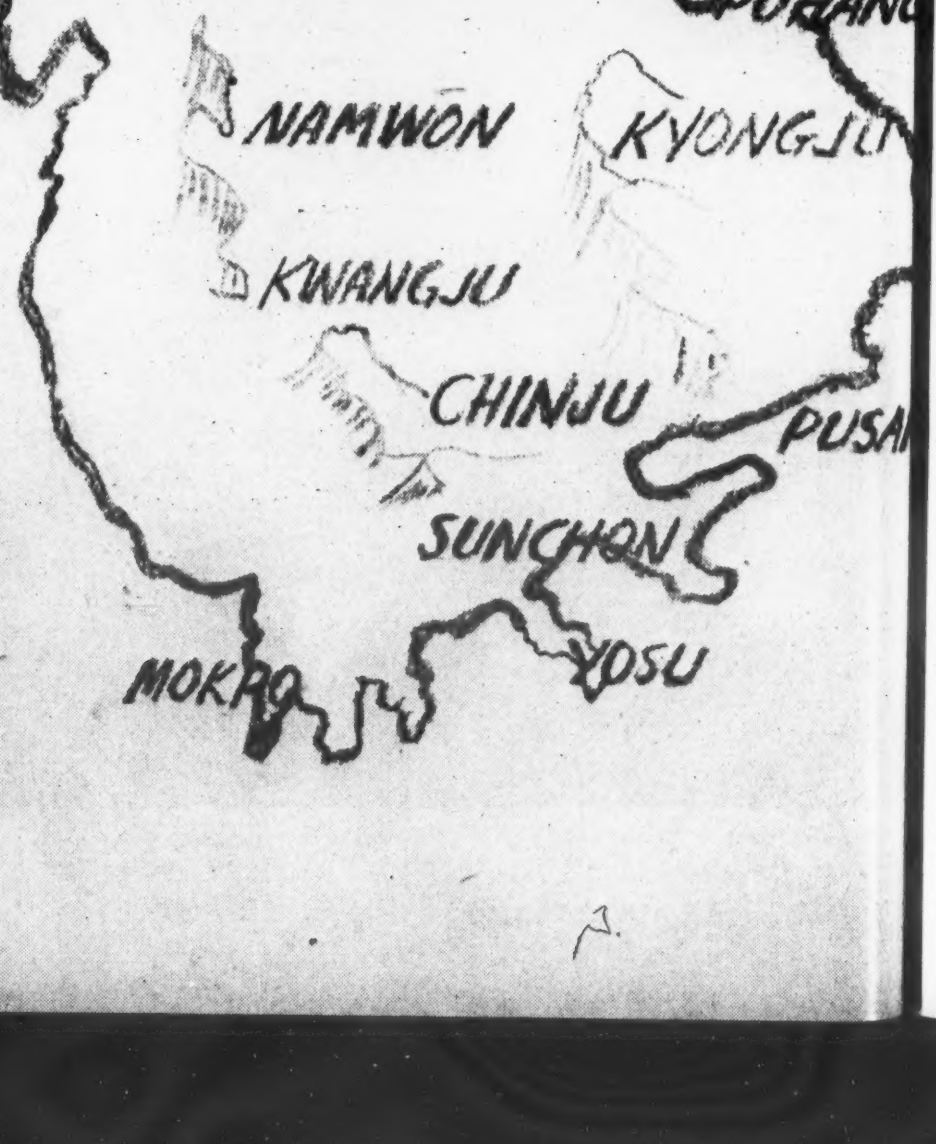
Photographers and Communicators in the advance area of fighting in Korea. Photographers Cpl. John S. Romanowski (upper) and Sgt. Charles R. Turnbull of the Photographic Division, General Headquarters, Far East Command, Tokyo, covering battle action. Below: Pfc. John J. Hudak and Sgt. Charles W. Escue operate communication equipment, Korea.

(KOREA)
PHOTOS - TOP TO BOTTOM: LT. W. H. FUNCHESS OF ROWESVILLE, S.C. (FOREGROUND), M/SGT. O.J. MIXON OF ATLANTA, GA.,REPORT FROM PLATOON COMMAND POST SOMEWHERE IN KOREA BY FIELD TELEPHONE

MOBILE RADIO UNIT ACTS AS COMMUNICATIONS CENTER ON THE KOREAN FRONT.....

AMERICAN SIGNAL CORPSMEN STRING TELEPHONE LINES ON POLES IN SOUTH KOREAN TOWN.....





U.S. ARMY

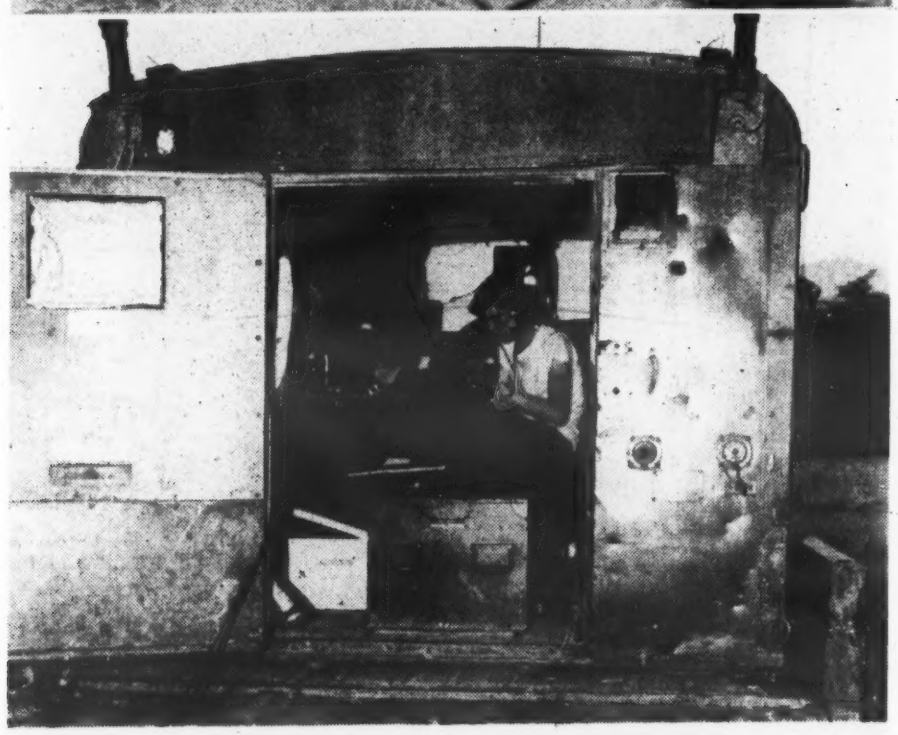
RADIOPHOTO

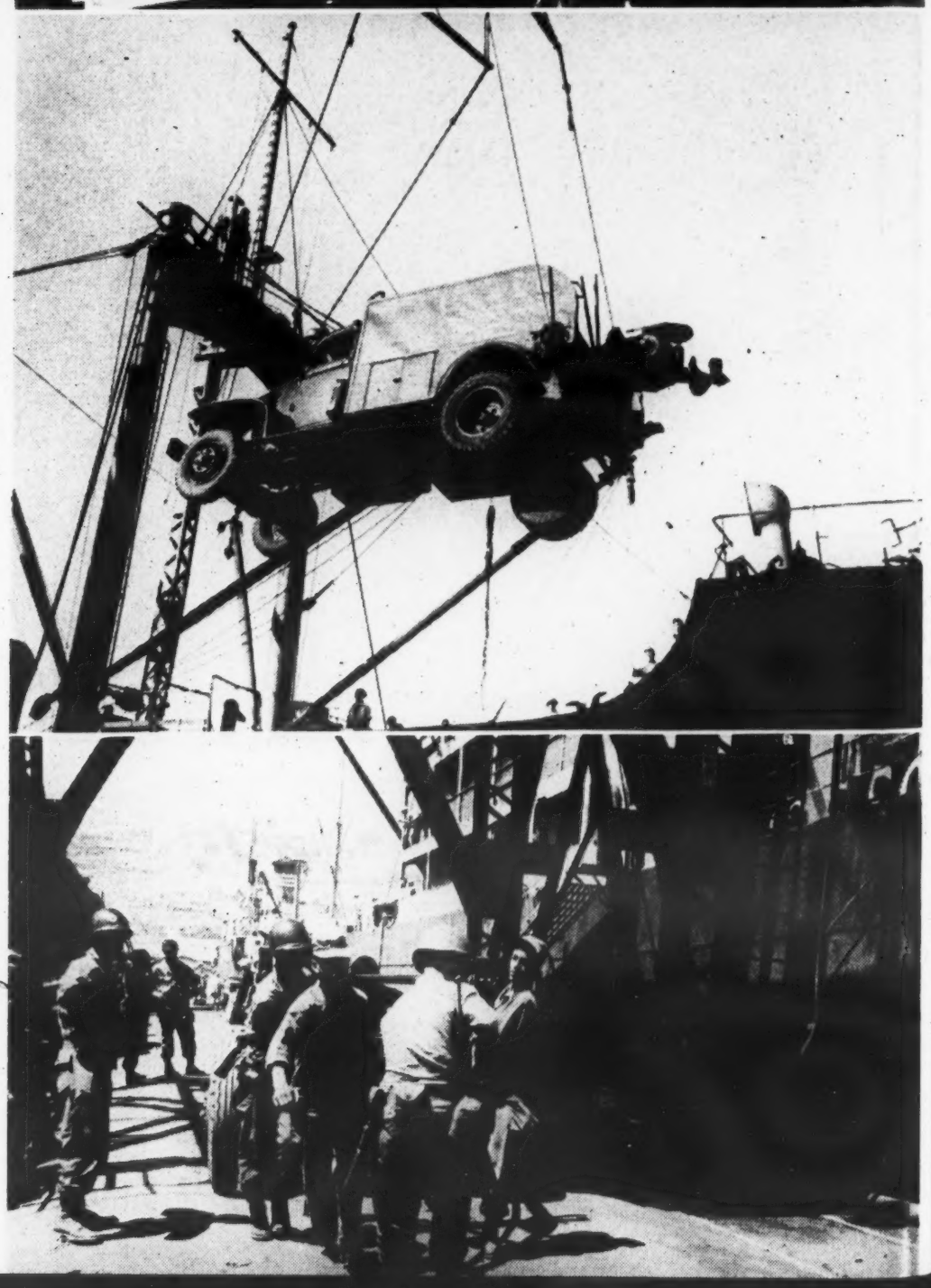
PLEASE GIVE CREDIT "VIA U.S. ARMY RADIO"

Signal Corps personnel are working 24 hours a day to bring action pictures from Korea to the American public via radio. Scenes at right show radio photos being received at the Pentagon, Washington, D. C. Below: Two photos received by radio. Compare these with prints reproduced on left hand page, made from original negatives.

War Scenes again. Again the familiar maze of wartime communication lines. Telephone exchange scenes are at Taegu, Korea.

Mobile equipment shown was near Korean front. Signal construction equipment was being loaded at Japanese port.





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THE MANUFACTURE OF *Copperweld Wire* FOR COMMUNICATION LINES

By F. E. Leib

Many armed forces communications men learned of Copperweld wire for the first time during the last war. Its use then became widespread. Thousands of miles went into the construction of long distance telephone transmission lines operating at carrier frequencies. Others used it for the first time in the construction of the rapid pole line type of telephone line. Still others will remember its use in three or seven-wire Copperweld strands for rhombic and other types of fixed antennas. And in every corner of the world, men carried Copperweld as the W106-A wire used for trailing and fixed antennas on military aircraft.

Most users of Copperweld wire know that it is a copper-covered steel wire and that it combines the strength of steel with the electrical and corrosion resisting properties of copper. They also know that at radio frequency, its conductance is comparable to a copper wire of the same size due to the skin effect of the high frequency currents. However, few know how this wire is made, and because its manufacture is very interesting and unique, we have been asked to write a discussion on its manufacture.

Copper Covering Century Old

The making of copper-covered steel wire is not new. Nearly a hundred years ago the advantage of combining the conductivity of copper and the strength of steel into a single high strength material was recognized. In 1860, copper-covered steel wire was made by wrapping copper strips around a steel wire and tinning the finished wire. Twenty-five years later another process was tried consisting of shrinking a copper collar onto a steel billet and rolling the resulting bi-metallic material. The patent records between that time and the early nineteen hundreds show a continuing effort to manufacture bi-metallic wire. Many of these processes were actually quite good and, as a matter of fact, some of the old material is still in use today. However, the principal difficulty with these older processes was a lack of uniformity in the material. Some of the wire would be excellent but other wire would be bad.

The Author

Mr. F. E. Leib is chief electrical engineer of the Copperweld Steel Company at Glassport, Pennsylvania. He is a former president of the AFCA's Pittsburgh chapter.

Most of Mr. Leib's material for this description of Copperweld wire manufacture was presented in a talk by him before the transmission and distribution committee of the Pennsylvania Electric Association at Philadelphia.

In 1915—thirty-five years ago, the Copperweld Steel Company began the manufacture of copper-covered steel by the molten-welding process, based primarily on obtaining a molten weld between the copper and the steel. Many improvements have been made in the manufacture of Copperweld wire since that time, but these are mostly associated with the details of manufacture and quality control. The basic principle of manufacture by molten-weld was sound at the time and has never had to be changed.

The method is quite simple in principle and not too complicated in detail, but the uniformity and quality of the finished product never ceases to interest and mystify observers. We tell the story of a visitor to our plant who said, "I have been using this Copperweld for the past fifteen years. I have just finished a trip through your mill and I saw how it is made but I still don't believe it."

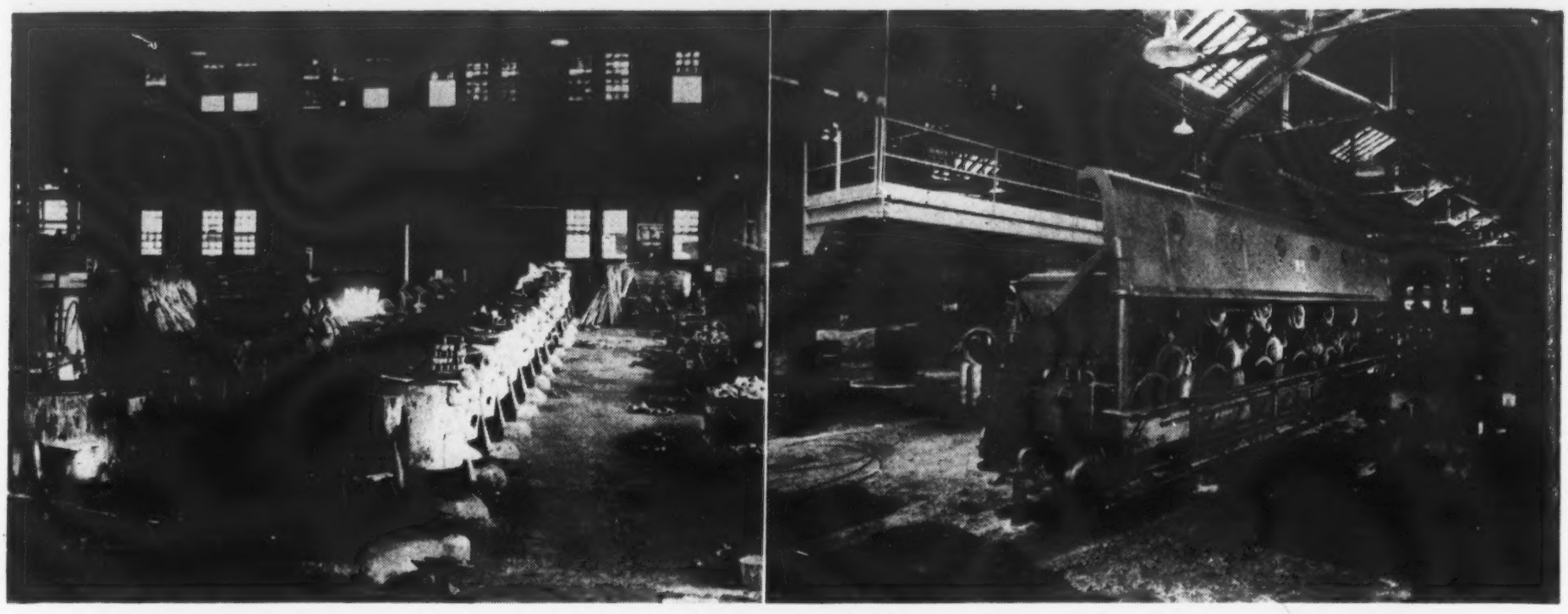
Copperweld is especially interesting in that it is both ferrous and non-ferrous and requires the detailed metallurgy of both ferrous and non-ferrous materials. To begin the process, our steel is obtained from approved sources in long bars about 21 feet long and approximately 6 inches in diameter. Then samples are sawed from each heat of steel received and taken to the laboratory to test for chemical analysis. These samples are also given a deep acid etch test for soundness. We make certain that we test at least one sample top and one sample bottom from each heat of steel received. We are very particular steel buyers and purchase under close specifications as to carbon and manganese content and grain size, also we require that residual elements such as nickel, chromium, molybdenum, etc., be low. These are very important requirements in the subsequent handling and heat treating of the material and also in the making a product suitable for overhead lines. In general, our design is based on obtaining high strength from the manganese alloy rather than the carbon, in order to obtain a more pliable wire which is easier to work and handle than the usual high carbon steels.

The long steel bars are sawed to a 42 inch length by means of a friction saw. After the steel bars are cut to the shorter length, they are placed in cleaning vats containing a solution of mild hydrochloric acid. This removes rust and stains on the surface of the steel. After cleaning, the steel is thoroughly washed, dried, and then placed within a mold preparatory to casting. The handling of the steel billets through these operations is by electro-magnet.

The Molds

The steel is smaller than the inside of the mold so as to allow room to pour the proper thickness of copper onto the steel in a later operation. The steel is centered at the bottom of the mold by a recess in the bottom of the mold. It is centered at the top by small graphite wedges. The molds themselves are manufactured from graphite with a clay binder. They are sealed before preheating.

The molds are on a car or buggy, and enter a preheating furnace. In this



Left: Scene in area of plant where copper is melted in gas fired furnaces. Right: High-speed wire drawing machine.

furnace the mold with the steel is raised to the welding temperature in a reducing atmosphere. When it has achieved this temperature, it is withdrawn from the preheating furnace and is placed in a pouring bay ready for the copper to be poured in the space between the steel and the inside of the mold.

In the meantime, the copper is being melted in gas fired furnaces. Raw copper is obtained in the form of electrolytic copper ingots. These are approximately thirty pounds each and have a minimum purity of 99.90 percent. The impurity, less than one-tenth of one percent, is principally oxygen. As the copper ingots are melted in the furnaces, there is a tendency for the copper to pick up additional oxygen from the air. This would be undesirable as it would lower the electrical conductivity of the copper, and it is offset by poling. The poling process consists of burning green wood underneath the surface of the molten copper. The burning oxidizes the wood, the oxygen being withdrawn from the copper. Periodic samples and tests are taken during the melting of the copper to determine how much poling is necessary.

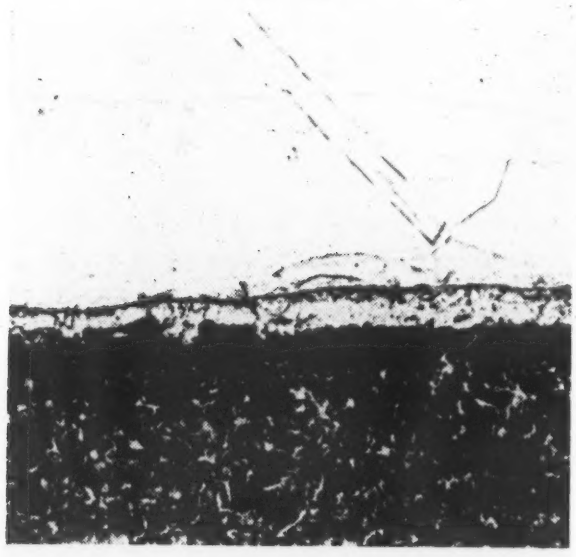
The copper is heated slightly above its melting point in the furnaces and tapped from the furnaces into a ladle and from the ladle into the molds. At this point, the copper and the steel are at substantially the same temperature, the melting point of copper, and a weld occurs where the two metals come together.

Weld Is Basis of Process

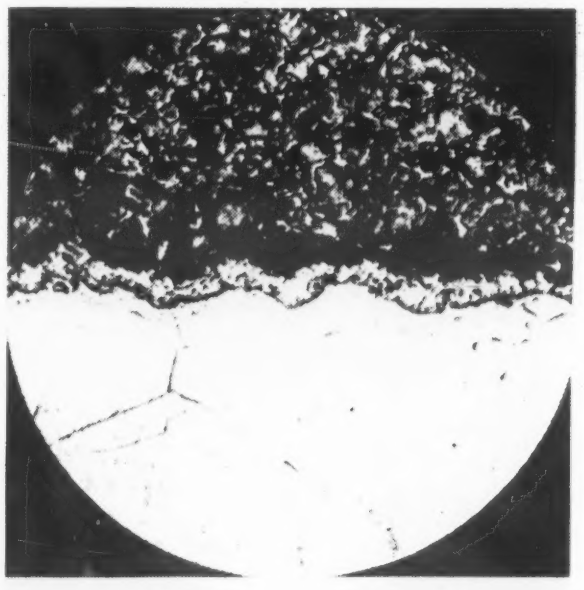
Upon pouring into the molds, the copper fills the space around the steel and the copper and steel grains, which are in actual contact, diffuse with each other and develop a definite weld area. This is best illustrated by photomicrographs showing the weld. Copper is a characteristically pure and large grained material and since it is a pure material, all of the grains have the same general appearance. However, they are not necessarily of the same size because of the different ways in which they have developed during solidification. The steel on the other hand, is principally an alloy of iron, carbon and manganese rather than a pure metal and it shows more irregularity in the grains and it has a smaller grain structure. The dark portions of the steel grains are principally iron carbide. The weld appears quite prominently on the photomicrographs as a light colored band between the copper and the steel. When the molten copper was poured around the heated steel billet, the copper grains diffused between the steel grains thus interlocking and joining the two metals securely.

The weld area microscopically shows some of the properties of both copper and steel. It is a form of iron-copper bronze and it is stronger than the copper. This weld is the basic point of the Copperweld process. Without it, it would be impossible to fabricate the material further using our hot rolling process. As a matter of fact, this point provides practical means for process inspection in that the billets fail during the subsequent rolling process if they are not completely welded. This is a fortunate condition since the wire would not be able to withstand the tensional and torsional stresses which a conductor receives in service on overhead lines unless the two materials were welded.

Longitudinal section of weld area in copperweld ingot.



Cross section of weld area in Copperweld ingot



Low Rolling Temperature

After pouring the copper, the molds, and Copperweld billets are withdrawn from the pouring bay, allowed to cool, and the billet is removed from the mold. After this, the billets enter a preheater furnace and are heated up to the rolling temperature of about 1800° Fahrenheit. It is extremely interesting that the rolling of Copperweld at temperatures of 1800° and below is quite unique in the steel industry. Most steel is rolled at temperatures of the order of 2100 to 2200° Fahrenheit. Temperatures of this order are, of course, not feasible with Copperweld since the copper melts at around 2000° Fahrenheit. The art of rolling Copperweld then becomes one of rolling the steel at a colder temperature than steel is normally rolled and still maintaining the original proportions and concentricity of the copper and steel.

The rolling action consists of running the Copperweld billet or bar between specially designed rolls so as to reduce the diameter of the billet without destroying the properties of the copper and steel. The first rolling operation is on a 24 inch mill which is a "three

high" or tilting table mill. In this mill the billet is rolled between two upper rolls, passing to the opposite side of the mill. The tables are then tilted and the billet returns to the original side of the mill, this time passing between the center and bottom roll. This is continued through smaller and smaller passes until the billet is reduced in diameter from approximately 8 inches round to an oval of approximately 2 x 3 inches. During this reduction in cross-section, the bar has become considerably elongated. For convenience in handling, it is then cut in half and also its temperature is boosted so as to pick up the heat lost in the 24 inch mill.

After restoring the starting temperature of 1800°, the bar proceeds through the 16 inch, 14 inch. 10 and 8 inch mills, finally being reduced to a 3/8 inch round. The rod is very much elongated at this time, but the design of the mill makes allowance for the longer length.

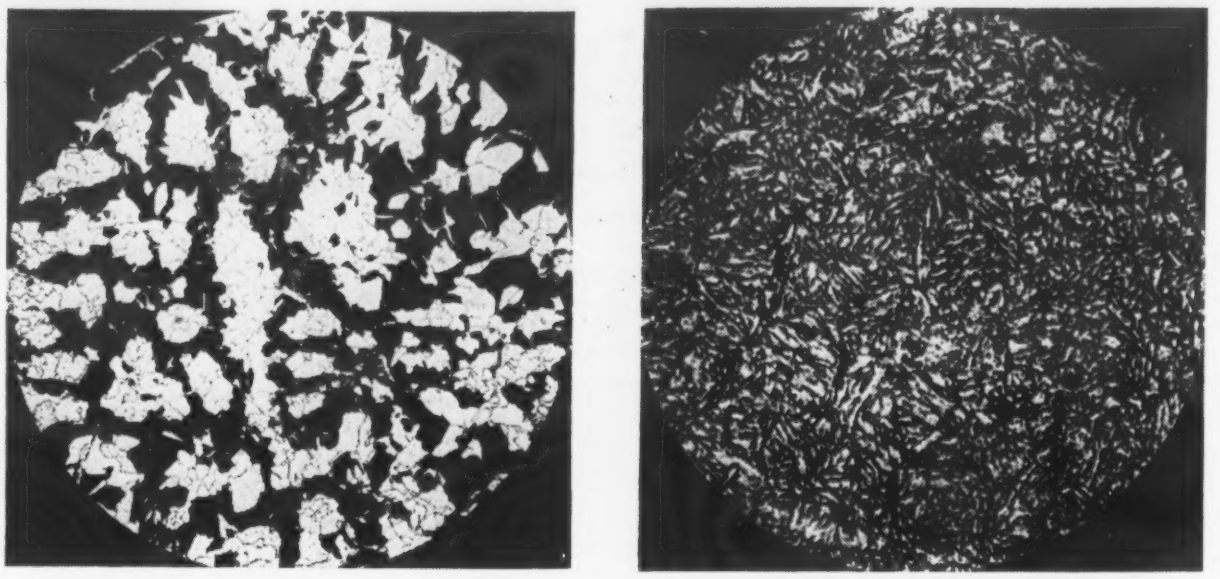
After the last roll to the 3/8 inch diameter, the rod is coiled onto a coiler which is similar to a payout reel except that it is, of course, operated in reverse direction. This coiler has removable pins to facilitate removal of the coil.

Drawing Process

During the rolling from the 2 x 3 inch oval to the 3/8 inch round, the rod has lost considerable heat and finishes the rolling at a temperature of the order of 1200° Fahrenheit. Thus the last few passes in the rolling mill, although basically a hot rolling operation, produce a partial cold rolling effect. This effect varies from end to end of the rod and also between various rods. In order to offset this effect, the coils are passed through a normalizing furnace which restores the structure of the steel to a uniform nature throughout each coil and to a consistent value between the coils.

The rod has now completed the hot rolling process and is ready to be prepared for wire drawing. At this point, the steel has a relatively large grain structure which is neither suitable for further processing in our mill or for use as an overhead conductor, even though it is of a uniform quality and consistency. The next step in the process is, therefore, to transform the steel to a suitable form for further drawing and handling. This is accomplished by placing the coil of 3/8 inch rod on payout reels and feeding them into the heat treating furnaces. These furnaces are of a special two section type having a quench tank between the two sections. The first section of the furnace heats the material, particularly the steel, above its so called critical temperature and this produces the desired small or fine grain structure, but it leaves the rod in a relatively hard condition.

The rod is then quenched fixing the grain size, after which the rod enters the second section of the furnace and is annealed or softened for further drawing. In this second section the temperature is below the "critical" so that there is no change in grain size. Photomicrographs taken at this point show the material to be metallurgically suitable for drawing and handling as soon as it is cleaned.



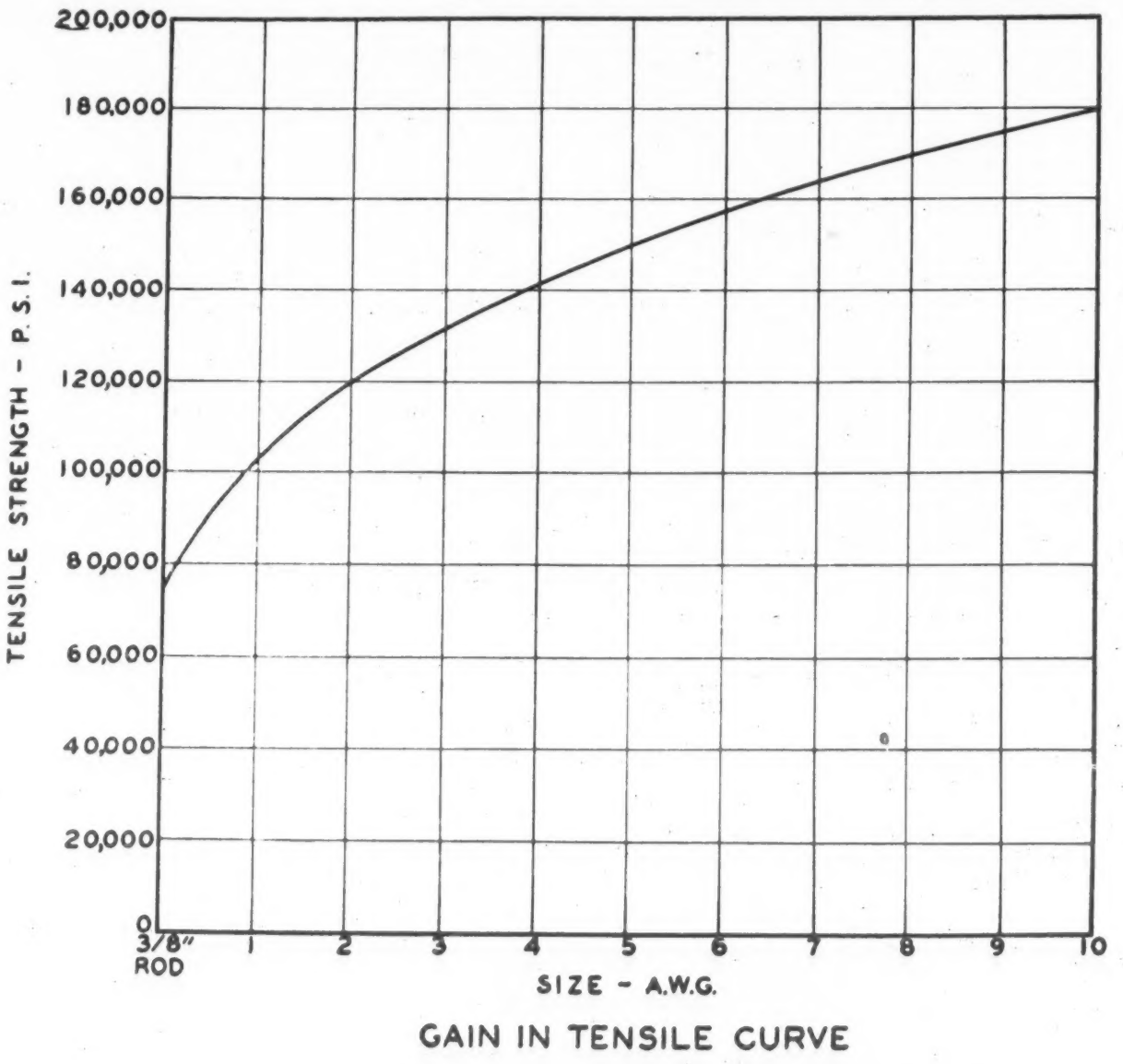
Photomicrograph of steel in 3/8" Copperweld rod, Left: Before heat treatment; Right: After heat treatment.

The cleaning or pickling process consists of soaking the coils in a mild sulphuric acid solution. This solution is of sufficient strength to dissolve the copper oxide but not the copper.

The rod is now ready to be cold drawn. This operation has a double objective. First, of course, it reduces the size of the rod to a practical size for wire to be used either as wire or as wires in a strand. The second objective is to increase the tensile strength of the material by the cold working. Copperweld hot rolled or annealed rod has a tensile strength of 60,000 to 70,000 pounds per square inch. During cold drawing the tensile strength of the material increases with each pass or draft in the drawing. An ultimate tensile strength of the order of 175,000 pounds per square inch, nearly three times the starting tensile, is feasible. Tensiles of this order make the material adequate and suitable for most overhead line applications, and actually provide about the maximum tensile that can be economically utilized on an overhead line. Since most of the wire used on pole lines is in the range of No. 8 to No. 10 Awg the Copperweld Mill has been designed to provide maximum tensile in this range of sizes.

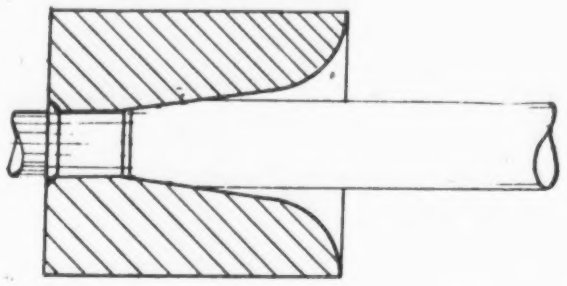
The drawing operation itself consists

Copperweld rod has a tensile strength of 60,000-70,000 lbs. per square inch. Tensile strength increases with each pass or draft in drawing. Ultimate strength of 175,000 lbs. is feasible.



GAIN IN TENSILE CURVE

of mechanically pulling the wire through a die hole which is slightly smaller than the wire being drawn. In general, the drawing of Copperweld is similar to the drawing of a homogeneous material such as copper or steel. It differs in detail, however, and the slope and curvature of the dies and the speed of drawing are closely controlled and carefully maintained.



Diagrammatic sketch of wire being drawn through a die.

The entrance to the die is along a moderately sloping inclined plane. The force exerted on the wire is, of course, perpendicular to the inclined plane. This force, when resolved into its components is found to be a push plus a squeeze. It is apparent that the squeeze is much the larger of the two forces. The slope of the die is such that the push on the material, or the longitudinal component of the stress, does not distort or alter the relatively cross-section of copper and steel. The compressive stress or squeeze, however, is very large and produces the reduction in diameter. In other words, the wire is squeezed or compressed to the point where it passes through the die.

The action within the material itself is one of elongating the grains and dovetailing the grains together. A diagram of a longitudinal section or a photomicrograph will illustrate the point very well.

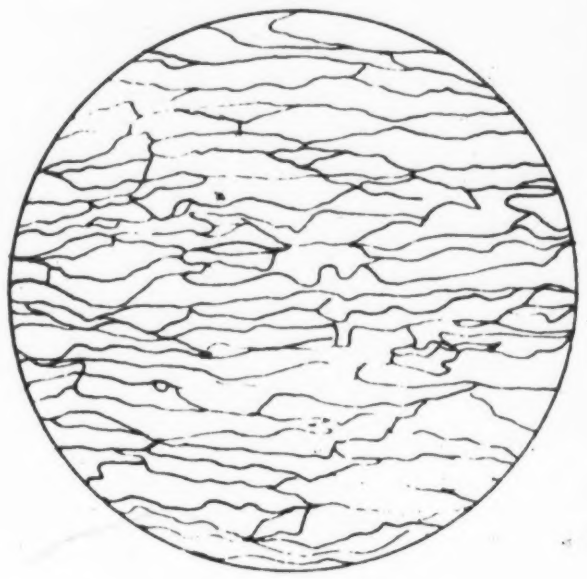
With progressive drawing, the grains which were originally hexagonal or round in shape are now elongated and dovetailed together. This elongation and dovetailing is responsible for the gain in strength and makes this material suitable for overhead line applications.

The practical means for drawing the wire is through high speed multiple die machines. It is common practice to take Copperweld wire through a 7 die machine which takes the $\frac{3}{8}$ inch rod down to No. 6 Awg. Each die gives the wire approximately one Awg reduction in size which is equivalent roughly to 20 percent reduction in area. The tension required to pull the wire through one die approaches 35 percent of the ultimate strength of the wire.

Strength Plus Pliability

In multiple drawing by our large Vaughan machines, the wire is pulled through a single die onto a drum and from the drum over an idler through the second die and onto the second drum. This is continued for the capacity of the machine. The position of the idler controls the speed of each succeeding drum and in this way adjusts the speed to the longer length of wire and to the variation in the dies. When drawing wire to the smaller sizes the equipment is similar but differs in detail due to the lighter wire being handled.

Most Copperweld wire is ultimately used for overhead lines and usually the maximum tensile consistent with reasonable pliability is desired. However, for applications such as tie wires, pliability or workability of the material is more important than the strength. For these applications where pliability is the primary requirement, the wire can be drawn to the final size and then annealed. In the annealing process the grains recrystallize to a round or octagonal shaped grain, restoring substantially the same condition and tensile

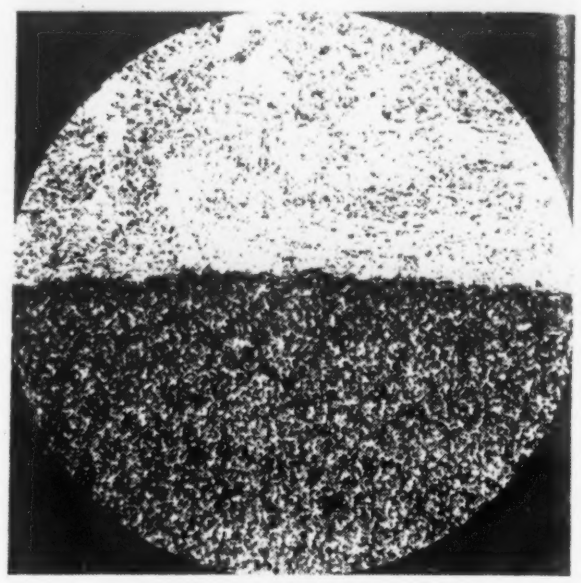


Diagrammatic sketch of steel structure after being cold drawn.

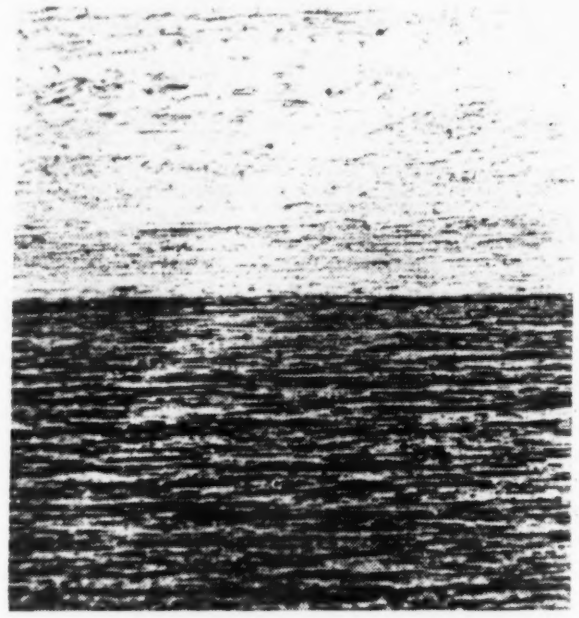
strength as was present before the cold drawing was started. In this condition Copperweld has a tensile of about 60,000 to 70,000 pounds per square inch but is nearly as pliable as annealed copper.

For intermediate applications where moderate strength is required but workability is also a main factor, wire can be produced as medium hard drawn. For Copperweld, this consists of hard drawing the wire to one Awg size larger than the finished size required. The material is annealed at this size and then drawn one hole to the finished Awg size. This practice combines the pliable grain structure with moderate elongation of the grains and produces a balance between annealed and hard drawn material. The applications for medium hard drawn Copperweld, however, are very limited since the hard drawn material is designed to be reasonably workable in its hard drawn state.

A point that is particularly interesting to a pole line engineer is the action that takes place within the conductor when the conductor is initially stressed. We are all familiar with the differences between initial and final sags and the fact the conductor elongates permanently on the initial stressing. Analysis of making hard drawn wire explains why this phenomenon takes place. The original hard drawn structure results from side pressures on the wire which elongate the grains and dovetail them together transversely. This dovetailing is also effective longitudinally but not completely so. Accordingly, on initial longitudinal stressing the grains are further dovetailed or set together by the longitudinal stress. This action is very interesting and is one of the reasons why it is difficult to define such terms as elastic limit, proportional limit, yield point and the like. Some definitions would actually class initial elongation as a strain beyond the ability of the wire to withstand additional stress. Of course it is not, it is simply a normal adjustment or permanent set of the grains in such a manner as to be able to best withstand longitudinal stress. The finish point for Copperweld wire itself is at the detailed inspection of physical and electrical properties such as strength, resistance, copper thickness, surface, elongation, toughness and many others.



Photomicrograph of weld area in hard drawn Copperweld wire. Above: cross section.



Longitudinal weld area in hard drawn Copperweld wire.

SIGNAL CORPS RESEARCH and its RELATIONSHIP to EDUCATIONAL INSTITUTIONS

By Harold A. Zahl

Signal Corps Engineering Laboratories, Fort Monmouth, N. J.

Research and engineering applications thereof are not new to the Signal Corps. Progressive technical programs relating to military photography and wire communication date back to the Civil War. The present U. S. Air Force was born of Signal Corps pioneering in aviation during World War I. Commercial broadcasting arose during the 1920's directly from extensive military research and developments precipitated by the preceding conflict.

From combined Service effort in World War II—and with magnificent contributions from the greatest scientific organization in all history, the Office of Scientific Research and Development, came modern television, radar, proximity fuzes and myriads of other electronic devices, some exclusively military and others now changing the structure of civilian life in the direction of better living.

Today the research and development center of your Signal Corps exists within three laboratories in the Fort Monmouth, N. J. area, with a personnel complement of 80 officers, 250 enlisted men and 2600 civilians. Out of the 2600 Civil Service employees, almost 1000 are classified as professional scientists or engineers; 250 as sub-professional; 700 as clerical; and 650 as ungraded.

Within the highly guarded confines of these three laboratories, personnel are engaged in an extensive research and development program leading to the production of the best and most advanced equipments for which the Signal Corps is assigned responsibility within the Department of the Army and the national military establishment.

Great as this internal program is, another program far more expansive, is carried on through contracts with industry, educational institutions and research foundations. All this effort is combined and continually being integrated with the Signal Corps' program into a single movement, leading toward improved military defense—with also the occasional by-product of items or knowledge which can be released for immediate civilian exploitation. It is that part of the overall program which deals with research under Signal Corps sponsorship being conducted by educational institutions on which I wish to place most emphasis in this discussion.

Equipment Responsibilities

First, let us consider the general technical scope of our contracted research program. The area of this effort is determined by the categories of equipments for which the Signal Corps has full or partial responsibility within the Department of the Army or the national military establishment, such as radiological instruments; photographic developments; detection projects involving sound or electromagnetic waves; electron tubes; facsimile and television; telephone, telegraph and other wire systems; radio communications; data transmission; aids to navigation; countermeasures against radio and radar systems; production of power by generators, primary and secondary batteries, and thermopiles; meteorological equipments; electronic components such as crystals, resistors, condensors and numerous others.

Development programs on devices as indicated above proceed continuously on the basis of the existing art. However, as a part of the Army's long-range program, research is underway extending the frontiers of knowledge in the sciences related to the various equipment categories. In that program, much of the basic and applied research is being carried on by educational institutions. In part, it may also be thought of as research in the field of magnetism and electricity, electron bal-

Presented before the ECRC at the Annual Meeting of the ASEE, Troy, N. Y., June 20, 1949, and published in the JOURNAL OF ENGINEERING EDUCATION, *Vol. 40, No. 5, January, 1950.*

The Author

Dr. Harold A. Zahl, director of research at the SCEL, has been associated in research and development work with the Signal Corps since 1931 when he was appointed a physicist at the Fort Monmouth engineering laboratories. In uniform during the war years, he attained to the rank of lieutenant colonel by war's end.

Before the war, for 11 years, he participated in many research and development projects, including work on sound, infra-red, vacuum tubes, and radar. He has been intimately connected with the Army program on radar since its inception and was civilian engineer-in-charge of the first service tests on Army radar. He has also been active in connection with the general Army program on vacuum tubes and is responsible for the development of a number of types used for Army equipment.

Upon separation from the Army in 1946, Dr. Zahl re-entered the SCEL as a civilian and was shortly thereafter named chief of engineering staff. He acted as official Signal Corps observer at the atomic bomb test at Bikini during the summer of 1946. Following his return from Bikini he was given the assignment of building up a long-range postwar research program for the Signal Corps, and in 1948 was appointed to his present post as director of research.

listics, microwaves, circuitry, elementary particles and their interaction, particle accelerators, solid state, deterioration prevention, electro-chemistry, polymers, mechanics, applied mathematics, computing devices, atmospheric physics, propagation, radiation and heat, acoustics, power generators, biophysics and other fundamental categories.

Unfortunately, it is not true that every educational institution desiring to do research under Signal Corps sponsorship, need only apply and funds and equipments will be made available. We have severe limitations in budget to contend with—we have particular areas of interest which must be explored through applied research because of priorities based upon urgent military requirement, and for such, men with highly specialized training are sought—and of course, under the present conditions of international stress, the military must also remember that it may be imperative, should conflict come again, that certain academic laboratories possessing outstanding personnel and facilities for work in particular fields of direct military interest, may have to quickly expand many-fold. All of these items enter into planning a military contractual research program.

Individuals Need Support

For truly basic research, the Army strongly favors a support mechanism such as is planned through the proposed National Science Foundation, since it is expected that only through such an organization can truly creative research receive the assistance it should have. Unfortunately, while such research is always important, it is never urgent, while applied research or development directed toward a military requirement often becomes urgent—and in comes the priority system! Basic research should more involve the support of creatively minded individuals than of projects, while for the most part, military research must involve a higher degree of organizational planning.

Let us now depart from generalities and consider a few of the details involved in a university's contractual research relationship with the Signal Corps.

The Signal Corps offers to educational institutions a fixed-price contract which will contain a provision that all unexpended funds be returned to the government. It is believed that this form of contract allows the institution the greatest degree of freedom in its operation of the contract and requires the least use of auditing personnel. This form of contract provides that a certain sum of money is available to the contractor which he spends in accordance with his ideas of the technical requirements of the contract, and the results of the expenditure of his funds are the property of the government. In most cases, contracts call only for quarterly reports on accomplishment. "Rights to publish" in scientific journals without prior government approval are generally granted in unclassified contracts. In all cases, publication and dissemination of unclassified information is encouraged.

Any such contract will contain an article known as "The Property Acquisition Article." This article provides that any materials or items purchased with government funds become the property of the government upon completion of the contract. In addition to direct purchases, if desired, provision may be made in the contract for the loan of materials by the government which, of course, must be returned at the close of the contractual period.

Equipment Loan to Schools

Another point on property may be of interest to mention. This concerns the loaning of Army equipment to colleges and universities other than those directly performing research under contract. In specific instances the Chief of the Technical Service concerned may direct the issuance of major items of Department of the Army equipment on a loan basis to educational institutions, upon establishing that such a loan will serve directly to benefit the Department of the Army's research and development program. Such loans will be made only after such institutions have agreed to indemnify the Department for the reasonable value of property lost, damaged, or destroyed through willful misconduct, or failure to exercise good faith on the part of its officials, except that such liability will not extend to those supplies destroyed, expended or damaged in authorized research activity.

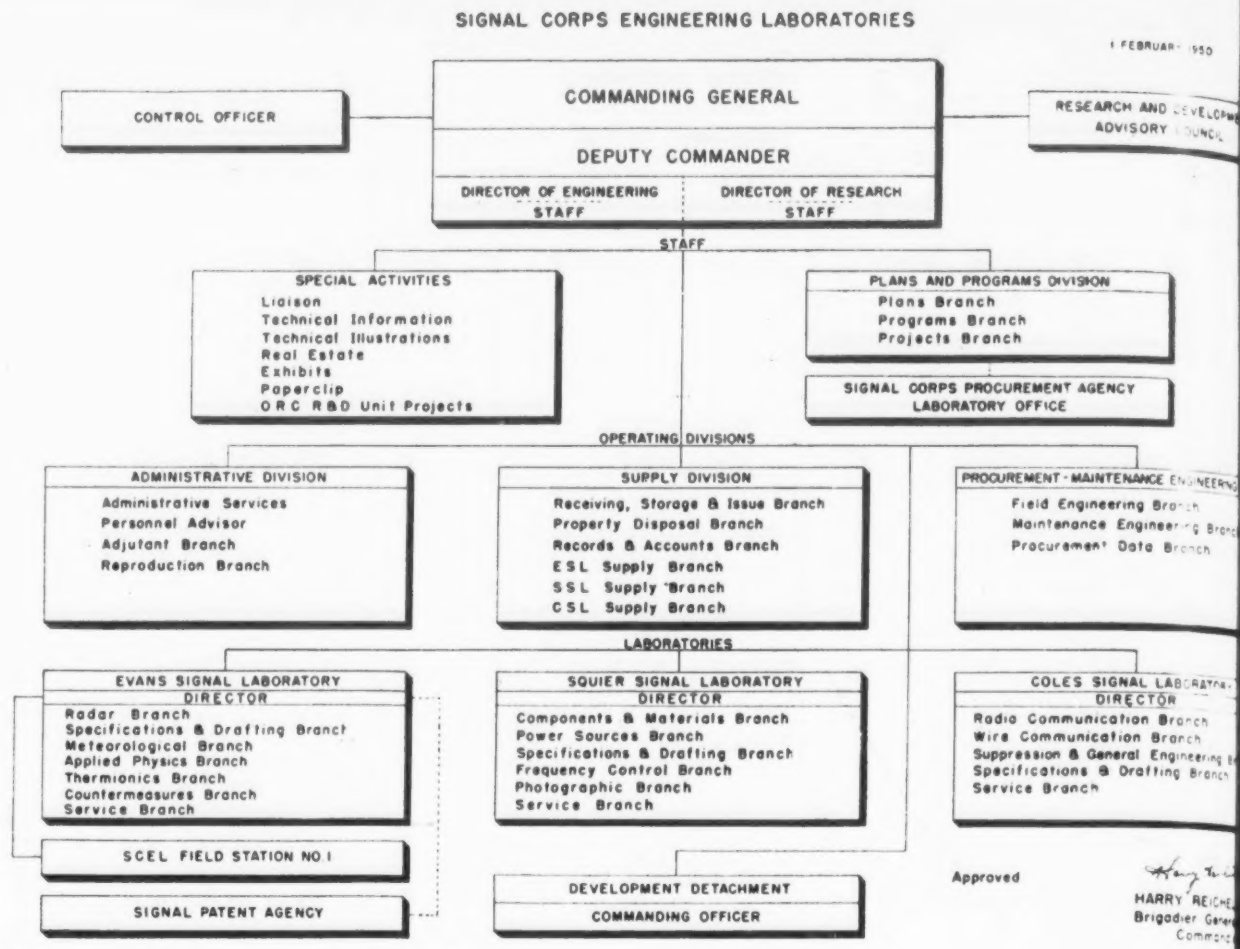


Fig. 1

It may be of interest to indicate that the Signal Corps Research Property Officer at present has a record of seventy-three research and development contracts with forty-nine colleges and universities under which there is government—furnished or contractor-acquired property. There are four loan accounts with academic institutions not under contract. The value of such equipment provided academic institutions by the Signal Corps for their use in research now exceeds $15,000,000.

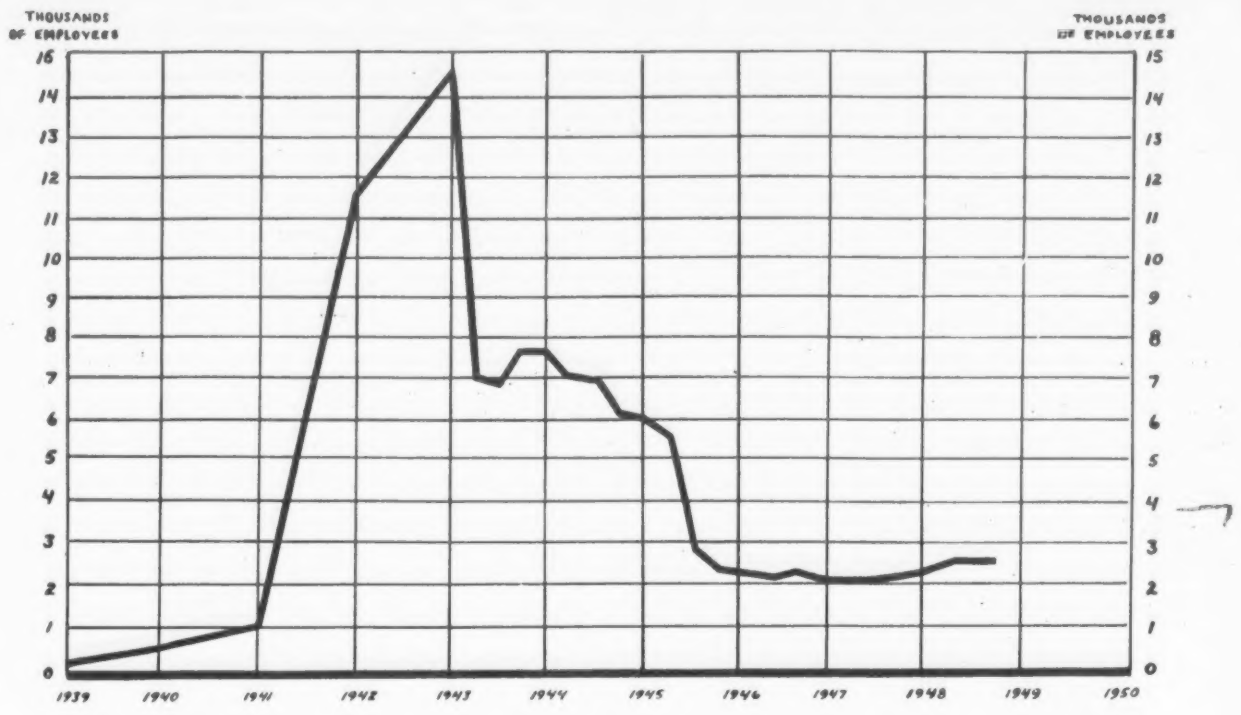
The last 10 years have seen the development of an increasing patent-consciousness on the part of universities and educational institutions. A significant feature has also been the growth of separate foundations frequently affiliated with a nearby university and serving to exploit patents on their behalf. While some universities still will accept a sponsored project dealing only with basic research, an increasing number are participating in developmental and applied programs directed toward producing commercially feasible products or having applicability for military purposes. Whether this is for the good or bad, I hesitate to guess—my audience surely is better qualified to judge on this point.

School Patent Policies

The patent practices and policies of a large number of educational institutions are today incorporated in either the regulations of the institution, resolutions of the board of trustees, or in some other written form. There are other schools whose patent policies, while not reduced to writing, are still fairly well crystalized. Today, schools without any definite patent policies are very few indeed.

It is believed that the great majority of the universities hold and administer patents to produce income primarily for future research. A few universities are opposed to any patent-holding policy, in whole or in part.

Since 1 November 1947, the effective date of current Joint Procurement Regulations under which the Departments of the Army and Air Force procure their research and development requirements, the government requires full title rights to all inventions resulting from contracts with educational institutions. These rights have been freely granted to the government in about 75 per cent of such contracts negotiated with the Signal Corps. However, where a proposed contractor has refused to grant the government title rights, deviation from this policy has been permitted in some unusual instances where it was determined that the particular university was uniquely qualified to perform the contract, and that the government would suffer irremedial loss if the proposed contract were not consummated.



Civilian employees Signal Corps Engineering Laboratories at close of fiscal years.

U.S. Liberal with Patents

As a general policy, patents owned by the United States Government are liberally licensed on a non-exclusive, royalty-free basis to anyone requesting the same for legitimate purposes. The government, of course, does not seek any profit by way of royalties on the patents which it owns.

It is of interest to note that during the past six years the Signal Patent Agency has administered the patent and copyright provisions of 106 research and development contracts between the Signal Corps and educational institutions. Approximately 80 per cent of these contracts were negotiated during the last two and one-half years. To date, 84 disclosures of inventions have resulted from these contracts. Since only about 30 of these contracts have been terminated, it is anticipated that several hundred more patentable inventions will evolve during the performance of the existing contracts—not to mention new contracts or extensions which will follow as the research program is continued into the future.

Passing from such mundane matters as fiscal, supply and patent procedures, permit me now to elaborate a bit on matters relating to that all-important product of the academic world—your graduates! In this connection, I'm sure many of you have at times wondered why, or even been critical of the Civil Service for its lack of attractiveness to the graduating student.

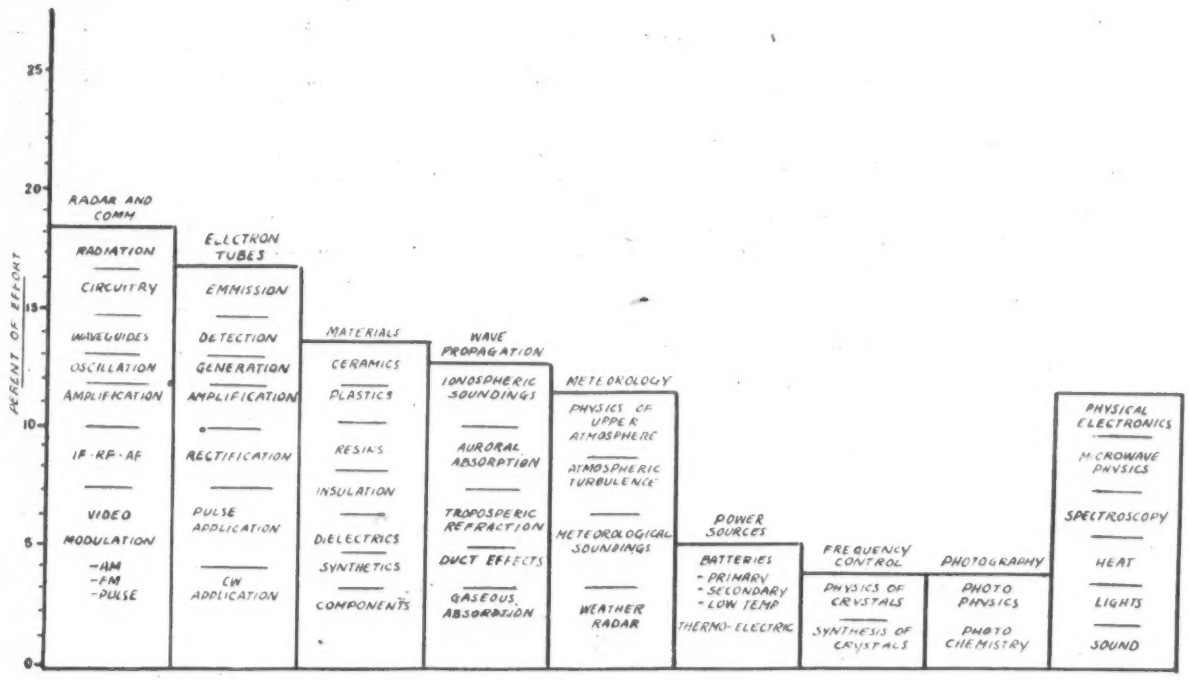
Bulk of Research for Defense

Undoubtedly some criticism is justifiable. We have just passed through the greatest war in history. For a period there was grave doubt whether we could ever win. We have retained our democratic institutions, but yet today the great bulk of Federal-sponsored research apparently must still be directed toward national defense. While we are at peace, great tension and fear remains. Primary justification for vast expenditures of the tax-payers funds, therefore, is not on the altruistic basis that research is desirable for the sake of advancing knowledge or raising our plane of living, but rather because of the grim realization that research will increase the security of the nation.

Many civilian scientists have difficulty in fully appreciating all the problems which pertain to the translation of research into weapons which when applied to modern warfare result in decisive action upon which victory hinges. There is a tendency to take the Armed Forces for granted without a full realization that there exist an intermediary scientific world without which the purely military or those who live in the highly rarified atmosphere of basic research could hardly work effectively together. I refer to that group of military men and civilians who are neither the Eisenhowers nor the Einsteins—but a group most essential for the military strength of the nation. It is this group to which most graduates will tend should they elect Army, Navy, or Air science for their career.

In peace there are great scientific opportunities in such a career—but should war come again it would indeed require a high degree of clairvoyancy to guarantee a completely uninterrupted scientific research or development career. Permit me to illustrate with facts known to me through personal experience.

Distribution of Signal Corps research in academic institutions.



Staff 50 to 14,500 in Decade

In 1931 the Signal Corps Laboratories staff numbered approximately 50, and the total yearly budget would not now sponsor one good-sized university research contract. We were at peace and government-sponsored research appeared unimportant, at least to those approving the budget.

Following December 7th, 1941, expansion of the Signal Corps Labora-

tories became so rapid that a peak of 14,500 civilian employees was reached late in 1942. Many of you will or have wondered just what an organization of that size with so many relatively unskilled personnel drawn so rapidly together could accomplish in a research and development program. But the exigencies of war produce strange requirements for a military research laboratory.

There was first a vast multi-billion dollar procurement program, much of which had to immediately be placed underway without guiding specifications — production was based simply on models or sketches—and manufacturers required technical guidance — there were fantastic maintenance and supply problems involving hundreds of thousands of separately listed parts, including some for tropical or desert climates, some for the Arctic—there were the training problems for combat troops involving the adaptation of non-technical personnel to operate and service highly complex equipment—there were many of our permanent technical staff drawn into the uniformed Services because there too specialists were required—there were hundreds of "operational blitzes" requiring emergency-constructed equipments, and even operations, and so on. Yes, there was little time for research.

Staff Buildup

War expansion of civilian groups was not too orderly. Order generally involves discipline, and discipline involves sacrifice of personal rights. Only men and women in uniform completely gave up their personal rights. Well I remember, in the months leading to and those immediately following the Pearl Harbor outrage, groups of 10, 20 or 30 new civilian appointees gathered under trees or temporary shelters receiving technical instruction from almost equally new personnel, pending assignment or completion of barn-type laboratories. The main scientific staff consisted of the permanent—the peacetime research and development cadre—but it was woefully small. There were many special quasimilitary scientific missions draining heavily upon the volunteer civilian scientist or engineer. Military personnel were only starting to receive technical training.

For example—in July 1941, a few months before actual hostilities began, it was rumored that the Germans were planning a surprise invasion of Iceland. Radar installations were desperately needed, for continuous air patrol was unthinkable. SCR-270 and 268 early-warning radars were coming off the assembly line — some soldier personnel had received preliminary training, but the need for experienced engineers was vital, since early radar was hardly foolproof.

Word was received one morning that a ship was scheduled to leave New York at midnight with the first signal aircraft warning company, and it was anxiously queried—"could the Laboratories give immediate civilian engineering assistance to the expedition and also provide certain equipments?" Civilian engineer volunteers were recruited from the laboratory staff during the morning —they secured clothing and other personal essentials in the afternoon—early in the evening they scoured the laboratories, filling trucks with incidental gear needed to install an emergency laboratory and keep radar on the air.

All rules of military supply accounting were completely abandoned in light of the emergency. That caused plenty of trouble later—but the men were ready, equipped, and sailed at midnight. Iceland got its radar protection! Weeks later the civilian contingent came back to the Laboratories—not for research—not necessarily for development—but to whatever problem was next thrown back from the impending, and later the actual war front—and hundreds came!!!

Then came autumn of 1943. Production was increasing—but even more help was needed by industry to accelerate further. On the first day of September 1943, 4000 personnel with electronics training received in the laboratory were given separation notices by the Signal Corps Engineering Laboratories. Industry absorbed these people like the water poured on dry sand. But the price the laboratory paid for this great service to production was tremendous.

Organization confusion followed as during the earlier rapid expansion—almost like a hurricane—first the terrific winds of expansion, then a few quiescent months as the center passed, and then the reversal as the winds of contraction swept through!! Yes, life in a military laboratory during wartime has its vicissitudes, but so does life in a fox-hole! No wonder at times Civil Service was often criticized by those looking in through a small peep-hole! What system can possibly be perfect when operating under the duress of mortal conflict?

School Tie-ins

However, for almost three years now, forces of relative stabilization have been at work, even though world-wide tension remains. Serious attention can and is being given to organizational planning aimed toward establishing an ever-improving research and development environment. For example, to improve the formal educational background of our employees, arrangements have been made since 1947 with Rutgers University to maintain a branch of that institution at Fort Monmouth through which graduate credit is offered in the fields of electrical engineering and mathematics. Admission is governed solely by the Rutgers Graduate School Faculty. Classes in the graduate program are scheduled twice a week in the late afternoon. Thus the employee attends school half on government time and half on his own.

Tuition charges to the student are also on the basis of one-half of the cost, the government providing the remainder in addition to the overhead administrative costs. Credits received in courses may be applied towards a Master's degree. Employees desiring to continue toward the Doctorate degree find it convenient to establish part-time academic relations with various nearby universities and at appropriate times are given a year or more leave of absence, without pay, following which they return to their original, or in most cases, an improved job assignment.

As a further step toward building up the scientific level of our employees, a recent announcement from the civilian personnel division of the Department of the Army now makes it relatively simple temporarily to add to our research staff faculty members from accredited colleges and universities for periods not to exceed 130 working days per year providing such personnel have special scientific qualifications for the positions to which appointed. Through this procedure, it is hoped to interest outstanding academic research personnel to join the Signal Corps particularly during summer months and conduct research in areas of military interest using established facilities not readily available elsewhere.

Employing Students

Similiar temporary employment may be given to graduate students for a period not to exceed one year provided the work performed is to be used by the student as a basis for completing certain academic requirements toward a graduate degree. And not to forget the undergraduates—part-time or intermittent employment can be given to a number of such individuals for period not exceeding 130 working days per year and at compensations not exceeding $925 per annum.

All the above represent part of a program to establish an environment which will draw a continuous supply of young scientists and engineers into the human framework necessary for a strong military laboratory—be it insurance for peace we hope—but ready for war if necessary.

A few words now on the matter of permanent assignments to young personnel just leaving collegiate life. During the five major reductions in force experienced by our laboratories, it was almost impossible to simultaneously consider any acquisition of young college graduates. Veterans of World War II were returning and competing for jobs held by World War I veterans, women, or by aged or crippled personnel not subjected to Selective Service—and by a few young men of outstanding technical qualifications who almost miraculously had been deferred from combat service.

(*Continued on page 52, col. 1*)

Times FACSIMILE Corporation

How does it happen that the *New York Times* is interested in the manufacture of facsimile equipment? This question is asked by almost everyone who visits the facsimile engineering laboratory and factory of Times Facsimile Corporation in the Times Building, less than two-hundred feet from Times Square, U.S.A. An air-conditioned streamlined plant of 30,000 square feet from which the parades on Broadway may be watched is a surprise to all visitors.

The plant is where it is because it just grew there. It started fifteen years ago when the *New York Times* wanted a picture transmission system for its newsphoto syndicate, Wide World Photos. The plant grew because the picture transmission system that Wide World Photos developed was selected by the Signal Corps for military service.

News of the first purchase order for Wide World's facsimile equipment was telephoned from Fort Monmouth on December 10, 1940. The Signal Corps had been studying the possibilities of facsimile communications for several years. The first military field tests with Times Wide World equipment were made during the Army maneuvers at Plattsburg, New York in 1939 and Ogdensburg, New York in 1940. The December 1940 date is significant — it marked the beginning of a rapidly growing interest in military facsimile communications. Since that date, steady progress has been made and hundreds of facsimile machines are now working around the clock on military circuits.

Times Facsimile equipment was used during the Ogdensburg maneuvers in 1940. Transmitter shown is the forerunner of Facsimile Transceiver FX 1

Facsimile 30 Years Ago

In checking back to the early beginnings, it is interesting to note that the Signal Corps supplied tubes, amplifiers, batteries and a radio transmitter for facsimile experimental work at the Massachusetts Institute of Technology between 1921 and 1924. The M.I.T. work was continued in private laboratories on a small scale until the system was adopted for newsphoto transmission by Wide World Photos in 1935.

The *New York Times* decided to discontinue its activities in the newsphoto syndicate business and sold Wide World Photos to The Associated Press on the first of August 1941. Because of the Signal Corps requirements for facsimile equipment, the photo transmission department of Wide World Photos was set up by the *New York Times* as a manufacturing subsidiary. At first, the subsidiary was called Times Telephoto Equipment, Inc. The name was later changed to Times Facsimile Corporation.

Wide World Photos' commercial newsphoto equipment was modified to meet military requirements and was standardized as Facsimile Transceiver FX-1. This machine was soon expanded into the TGC-1 Model, handling larger copy, to meet the requirements of the meteorologists of the Air Force.

The Model FX-1 facsimile transceiver served many needs in the ETO. During the invasion it was used for the transmission of important air reconnaissance information to the Army troops on the beach. Captured enemy documents were transmitted back to corps headquarters in their original untranslated form. Facsimile moved message traffic when mortar fire interrupted teletype operation because of vibration. The OWI used the commercial version of the equipment for transmission and reception of war pictures through a world wide network including area networks in Africa, Europe, Asia and the Pacific area.

The TXC-1 transceiver is a modified FJ-1, designed especially for the transmission of weather maps. Between London and Granville, France, the TXC-1 machines operated nearly 24 hours a day supplying important weather information to the Allied air forces. The successful operation of weather networks in the ETO established the foundation for a network throughout the United States soon after the war.

FACSIMILE SET AN/TXC-1B

The standard type of facsimile transceiver, AN/TXC in extensive use by the Air Force.

Facsimile recorder model RG leased by the Navy, Weather Bureau and commercial airlines for use on the national facsimile network.

At a joint weather central located in the Weather Bureau building in Washington, approximately fifty weather maps are now transmitted daily to more than two hundred weather stations at military and commercial air fields. The air weather service of the Air Force transmits daily weather maps by radio to Washington from Germany, Hawaii and Japan. The Navy transmits daily from Guam, Hawaii and San Francisco directly to Washington. The pioneering of facsimile transmissions to and from ships at sea has been achieved by the Navy.

The icebreaker Burton Island positioned off the Shackelton Ice Shelf in the Antarctic Ocean operated a daily facsimile schedule directly with Washington, D. C., a distance of 10,500 miles. Navy and Coast Guard ships from the arctic to the antarctic copied weather maps, press, messages and comic strips directly from the Navy's transmitters at Annapolis. Under poor radio transmission conditions, many times it was only possible to get through with facsimile transmission.

Use By Services

The Signal Corps' first standardized facsimile set, the FX-1, is patterned after the pre-war commercial equipment which was designed for small quantity production. When the Air Force asked for a larger machine for weather map work the drum dimensions of the FX-1 were stretched to accomodate the 12" x 18" maps. When the pressure of wartime production eased off in 1945 several modifications to the TXC-1 weather map transceiver were made in the interests of improved reliability.

At the same time work was started on a new type of recorder to meet the requirements of a rental plan that was being developed for the Navy. Since nearly all the requirements were for receiving weather maps, not transmitting them, it was possible to design a machine more automatic in operation, smaller in size, easier to service and fabricated by mass production techniques.

The new recorder, known as the Model RG, is now being rented by the Navy for approximately 50 stations. More than 20 commercial airline offices are also using this machine. The Weather Bureau has several important installations equipped with the Model RG recorders. Over 70 installations are now being made for the Air National Guard. This recorder has seen sea service on several Navy and Coast Guard ships. The equipment will probably be used by merchant ships as soon as a regular system of weather map broadcasting is established on a round-the-clock basis.

A large portion of the activities of Times Facsimile are devoted to engi-

(*Continued on page* 64, *col.* 1)

Supplement to "Cable Operations In Wartime France" (Mar. Apr., '50 Sig.)

A Letter From

Lt. Col. Joel C. Hertsche

Department of Amplification

I read with great interest the article in the March-April 1950 issue of SIGNALS entitled "Cable Operations in Wartime France," and wish, among other things, to thank Howard Hunter for bringing it to your attention. Howard played no mean part in the restoration of many of these cables, and certainly could, had the muse been upon him, have produced an excellent translation of the article himself.

I, also, was somewhat involved in the repair and restoration of the cable net in Southern France and believe that, like the *New Yorker* magazine, you might appreciate a "Department of Amplification."

Cable Damage

The main underground communication route north of Marseille consisted of two cables, via slightly different routes, to Lyon, where they branched to the west, to Dijon in the north and to the east. The largest and oldest of these cables was loaded about the equivalent of our old H-172-106 for shorter haul two-wire circuits, with a large complement of H-44-18 for four-wire operation. This cable was repeatered at Marseille, Le Pontet (near Avignon), Valence, and Lyon.

The second cable was smaller and was loaded H-88-36 or thereabouts for two-wire operation and H-22-9 for a fancy type of band splitting four-wire operation similar to our own "EB" systems, but of higher quality from a frequency-band standpoint. The light loading and the use of higher frequencies necessitated the addition of repeater stations at Lambesc, Donzere and Roussillon, in addition to those on the other route.

At the time of the arrival of Continental Base Section in Marseille, both these cables were in bad shape. The repeater station at Marseille had been rendered impotent by destruction of the batteries and by other German sabotage. The station at Le Pontet was completely destroyed, as was the new one at Lyon. This latter loss was partially remedied by the reestablishment of the old repeater station there, which served our purposes very well. The repeater station at Valence, on the other hand, was practically undamaged, this being the one that Colonel Hunter mentioned where the technician threw the bombs out the window. The cables themselves were pretty severely cut up, due to bombing and sabotage and the larger cable had some very long sections missing, due to bombing of bridges across the Rhone, which this cable crossed twice between Marseille and Avignon.

Trans-Alpine cable being erected on mountainside-Hautes-Alpes country. Arc River in distance.

Trans-Alpine cable being placed on P.T.T. lead. Hautes-Alpes country near Franco-Italian border.

The smaller cable was also cut up and, since it crossed the Rhone a couple of times north of Le Pontet, had long sections missing also. At Vienne, just south of Lyon, the cables had been damaged for some distance. Several load pots had been damaged or removed along both cables, which increased the problem of immediate restoration.

Repair Task

After due consideration of all factors, it was decided to make all circuits four-wire, routing them on the heaviest loading through the smaller cable via Lambesc, where they were repeatered, to Le Pontet, and thence, still on heavy loaded pairs, to Valence, where the circuits were again repeatered. From Valence to Lyon, the circuits were routed on the H-44 pairs and again repeatered at Lyon. Lyon was planned as a switching center to all points.

Accordingly, cable crews from signal troops assigned to the base section, and from civilian employees of the PTT, and an excellent crew loaned to us from the Sixth Army Group were dispatched along the cable to repair it sufficiently to restore continuity. No load coils were replaced, nor any great attempt made to restore the cable to its pristine condition. Breaks and points of sabotage were located and repaired, a section of cable was placed at Vienne, and the smaller cable was cross-connected to the larger one at Le Pontet.

In the meantime, the PTT had not been sleeping. Batteries were found for Marseille, tubes and relays were replaced at many places and, with the cable repaired, before too long, the first

(*Continued on page* 58, *col.* 2)

HALOID'S

Diversified Products Serve the World

Dry process, Xerography, prints on a metal plate without use of chemicals.

Founded in 1903 as a manufacturer of photographic papers, The Haloid Company, Rochester, N. Y., has expanded its activities during the intervening years and its products now include not only photographic papers, but photo-copying machines, photocopy papers and photocopy chemicals, negative materials for the graphic arts, and XeroX products for xerography.

Haloid products are used in practically every phase of the economic life of the United States, Canada and many foreign countries.

Haloid, which takes its name from chemical salts used in emulsions, is the second largest producer of sensitized paper in the country and one of the reasons for Rochester's fame as a photographic center. Nearly 40 miles of sensitized papers are produced in Haloid's two sensitizing plants each working day. Glamor pictures of Hollywood stars, news shots, portraits, commercial subjects, vacation snapshots, high school and college students, and a host of other subjects are brought to life on Haloid photographic papers.

The armed services of the United States use a large amount of Haloid photographic papers for aerial photography and other purposes.

Foto Flo copier can produce up to five 18" x 24" photocopies a minute.

The Air Force uses Haloid in quantity for aerial photography.

To provide greater service to its customers and a wider field for its newly developed Record photocopy papers, The Haloid Company in 1935 acquired the Rectigraph Company, manufacturers of the Rectigraph Photo-Copying Machine.

The development of the photo-copying process is credited to George C. Beidler, founder of the Rectigraph Company in 1904. Tiring of the endless drudgery of copying documents by hand, Mr. Beidler, an Oklahoma abstractor, determined to devise a quicker and more accurate method of copying legal documents. His experiments showed photography to be the solution to his problem.

Mr. Beidler came to Rochester, N. Y., then, as now, the photographic center of the world, to find suitable manufacturing conditions and skilled help. In 1906, he obtained patents on the first photo-copying machine . . . the Rectigraph. New models have been developed over the years including the new Foto-Flo Model C which can produce up to five 18" x 24" photocopies a minute.

Haloid manufactures ten types of photocopy papers to meet the specific needs of commercial blue printers, photocopyists, government agencies, county recording offices, newspapers, universities, department stores, insurance offices, the armed services and business in general.

As envisioned by Mr. Beidler, the photocopy process is a speedy, economical and exact method of reproducing anything written, printed or drawn.

Haloid's research department has kept pace with the growth of the offset lithographic industry by developing several negative materials for the graphic arts.

Transaloid, a water-resistant transparent negative paper has a resolving power close to film, yet costing considerably less. Color sensitive, it has a wide range of uses including the making of line and halftone negatives for offset plates, positives for diazo prints, white prints and other types of reproductions.

Lithaloid, used by offset lithographers and photoengravers, is a negative film material with a contrasty emulsion which produces maximum density with unusual orthochromatic sensitivity. It is especially designed for making halftone negatives.

As an inexpensive medium for producing line negatives and positives Lithaloid Negative Paper is noted for opaque blacks and clean sharp whites.

Haloid's latest achievement xerography, a new dry process using electrostatic principles to make reproductions of letters, charts, drawings and offset master paper plates for office duplicating machines was developed in cooperation with the Battelle Memorial Institute of Columbus, Ohio.

The xerography process differs from other graphic reproduction methods because it eliminates chemical solutions, fumes, negative and sensitized papers, using instead special prepared powders and plates manufactured under the trade name XeroX.

Haloid materials are extensively used in big studios.

Special Haloid negative papers and films are widely used in lithography for the making of line and halftone negatives.

Here's how xerography works. The photoconductive plate used in xerography corresponds to the film or paper used in ordinary photography. This plate which is coated with a "photoconductive insulating material" is a non-conductor of electricity in the dark, but becomes conductive when exposed to light.

When the coated plate is "sprayed with electrons" by a simple electrical device incorporated in the machine, its surface becomes electrically charged in 8 to 10 seconds. In the charged condition the plate is sensitive to light.

The sensitized plate is exposed in the same manner that a silver-emulsion film or silver-emulsion paper is exposed to an image pattern. Whenever light strikes the plate, the coating becomes conductive and discharges the electrostatic surface charge into the backing metal. On the places where light does not fall, the surface charge remains. Thus the image pattern causes a "latent electrical image" to remain on the plate. Dry development makes this latent image visible to the eye. The exposure is equivalent in time to that required by fast silver halide projection papers.

Developing is done by flowing specially prepared developing powder over the plate. The powder is attracted to the charged portions of the plate and adheres to those portions tenaciously. The light-affected portions of the plate are unable to retain the powder and it

(*Continued on page* **58**, ***col.*** **1**)

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Monmouth ROTC Conference

Maj. Gen. Spencer B. Akin, Chief Signal Officer of the Army, sent an invitation to the presidents of the forty universities and colleges which have ROTC Signal Units, to be the guests of the Signal Corps at Fort Monmouth for three days—July 11, 12, 13—while the ROTC summer camp was in progress.

Colonel Dixon, Executive Secretary of the AFCA, was asked to attend this 3-day conference which included presidents, deans, or senior educators from all the universities and colleges concerned, and other distinguished guests.

The visitors arrived during the morning of the 11th and were welcomed by Maj. Gen. Francis H. Lanahan, commanding general of Fort Monmouth, and his staff at luncheon. General Lanahan, Major General Kirke B. Lawton, Deputy Chief Signal Officer, and Col. Heath Twitchell, ROTC Camp commandant, spoke briefly concerning the organization of the camp and, in a general way, covered the training and the work done by the ROTC college cadets during the six-weeks training course.

Following the luncheon, the group of visitors was divided into five sections and inspection of some of the buildings and Signal Corps exhibits used during Armed Forces Week was made.

That night dinner was given for the group at Gibbs Hall. General Lawton, acting for the Chief Signal Officer, gave an inspiring talk on the need for young officers in the Army in general and the Signal Corps particularly, stating that the opportunity for regular Army commissions would be given several of the ROTC cadets at the end of the summer camp.

The AFCA Executive Secretary was called upon to say a few words concerning the function of the AFCA in defense and security plans, and its relation to the Signal ROTC.

Colonel Wally Watts, president of the Philadelphia Chapter and recently elected first vice president of the Association, then delivered a most interesting address on the importance of scientific advancement of the armed forces.

On the second day of the conference, the group made an inspection of the ROTC cadets' work with signal equipment in the field, following which a luncheon was held in Gibbs Hall. General Akin; Brig. Gen. David Sarnoff, chairman of the board of RCA; and Maj. Gen. Bryant E. Moore, superintendent of the United States Military Academy, were the guests of honor.

General Akin spoke on the important function of ROTC in the national training program and introduced General Sarnoff who addressed the group on the role of science and the training of youth in national defense. General Sarnoff's talk was delivered with his usual verve and was very well received.

Following the luncheon the guests were entertained in the Fort Monmouth Theater with a lecture-demonstration by Dr. J. O. Perrine, assistant vice president of the A.T.&T. Co. They then visited in turn the various laboratories and classrooms where the students were studying instructor training, public speaking, structural writing, and reading improvement.

The evening of the second day the visitors dined at Gibbs Hall and were addressed by Dr. W. Compton, president of Washington State University, and Dr. R. B. Van Lear, Jr., president of Georgia Institute of Technology. Both gave inspiring and most interesting talks.

On the last morning of the conference, various sections of the Signal Corps laboratories were visited. Brig. Gen. Harry Reichelderfer spoke briefly to the group on the organization of the laboratories, which was followed by an inspection trip through Squire and Coles laboratories. The inspection was followed by luncheon in the ROTC mess halls, each college representative lunching with the cadets from his seat of learning. The conference ended with this luncheon.

Col. Dixon was given an opportunity to talk with the Assistant PMS&T instructors from the different schools who were there in the ROTC Camp as staff officers and instructors. The Executive Secretary stressed the importance of ROTC membership in the Association and the benefits which would be derived by local student chapters in the various universities.

The various college presidents and educators expressed their appreciation of the fine show put on by General Lanahan and the camp staff. It was apparent that they were all much impressed by what they had seen and heard during the three days.

Naval Academy Award

The annual AFCA award made to the graduating midshipman having the highest ranking in electronics was won this year by Robert Rawson Monroe of Knoxville, Tennessee. A former seaman who won a competitive examination for appointment to Annapolis, Midshipman Monroe graduated at the head of his class. In addition to the AFCA award, he received seven other prizes at the annual awards ceremonies and a letter of commendation from the superintendent of the Naval Academy.

The AFCA prize consisted of an RCA portable radio receiver donated by Colonel W. W. Watts, vice president of RCA Victor and 1st vice president of

Southern Chapters Visited

A Report From Executive Secretary Dixon

We wish we had the time and the funds to visit more of our chapters, and to see them in action. It is always an inspiration to get out among our members, on their home grounds, and to experience the good fellowship and friendliness that exist among the majority of our membership in the AFCA.

Our recent trip to the chapters in South Carolina and Georgia is a good example of just that. The first stop was at Columbia, S. C., where Colonel Fred Fister and his staff have built up a vigorous and progressive chapter during the past year.

Bill Mansfield, Area "C" AFCA representative, national director, and last year president of the Atlanta Chapter, came over to the South Carolina Chapter meeting with Ralph Grist, this year's president in Atlanta.

Colonel Henry Hort, Signal Corps, stationed at Camp Gordon, and president of the Augusta-Camp Gordon Chapter, came to the Columbia meeting with Hugh Fleming, last year's president of that chapter.

During the meeting Colonel John Young of Charleston was elected president of the South Carolina Chapter, and we had the unusual honor, at the head table, of sitting at the same time with the presidents of three AFCA chapters and their respective immediate past presidents.

The dinner meeting was held in the Crystal Ballroom of the Hotel Columbia and was attended by a mixed group of civilian and service personnel—members and guests. An excellent dinner was served. The Executive Secretary's talk on the past, present, and future of the AFCA was well received and resulted in a general discussion of some of the points raised.

A pleasant cocktail interlude preceded the dinner, and an opportunity was given those present to talk with old and new friends. We always find that these informal sessions before a meeting or dinner do much to break down the usual stiffness and impersonal atmosphere of such gatherings.

We left this meeting feeling that we had experienced real Southern hospitality, and that with such a fine group the South Carolina Chapter will continue to thrive under its new officers and directors.

The following day Bill Mansfield and Ralph Grist drove us over to Augusta, picked up Hugh Fleming and some of the other local AFCA folks, and then out to Camp Gordon. Here we were met by Colonel Hort who entertained his chapter directors and executive committee at lunch at the officers' club.

After an enjoyable luncheon the Executive Secretary was called upon to discuss some of the current and pertinent association problems. This talk was followed by a round-table question-and-answer session which developed much interesting and worthwhile discussion.

It was gratifying to see the real interest shown by those present, among whom were five Southern Bell men, six officers from Camp Gordon, and the associate editor of the *Augusta Herald*. We left this meeting with the feeling that the Augusta-Camp Gordon Chapter is also in highly capable hands for the coming year.

After lunch Bill and Ralph drove us on to Atlanta. To us it was new and most interesting—our first ride (on the ground) across that part of the United States. We passed along "tobacco road" and found most of the houses to be clean and livable looking. The mills might have been transplanted from those we used to know up in New England.

We stopped at Stone Mountain to see the beginning of Borglum's gigantic carving of Generals Lee and "Stonewall" Jackson, and President Davis. Standing and looking up at the mass of solid granite rising 2000 feet in the air and measuring seven miles in circumference, one feels what an insignificant part he has in this great universe.

The figure of Lee is 178 feet from the top of his hat to the horse's hoof, yet it appears to the onlooker to be merely a good-sized figure, perhaps 20 or 30 feet high, due to the immense expanse of the granite background.

The following day Mr. Hal Dumas gave a luncheon in honor of the Executive Secretary at the Atlanta Capital City Club. The top staff of the Southern Bell Telephone Company, industrial representatives, and officers from the Third Army headquarters were present.

We thought it one of the most pleasurable luncheons we've ever attended—and we figure that, conservatively speaking, we've lunched some 20,000 times! It was a delicious meal—real Southern cooking.

Again we were pleased and delighted with the sincere interest in the AFCA. Mr. Dumas spoke at some length on the worthiness of our Association and offered all his facilities toward the fulfillment of our aims.

Before we left for the airport, Ralph Grist took us out to see the famed "Cyclorama" at Grant Park. We have never seen anything to compare with this almost living picture of the Battle of Atlanta, fought July 22, 1864. It is impossible to adequately describe this circular painting and work of art. 50 feet high and 400 feet in circumference, it portrays blasted tree stumps, bushes and shrubbery, shell-torn in effect, hundreds of lifelike plaster-of-paris figures of Confederate and Federal soldiers, twisted railroad rails and ties, shells, cannons, horses, wagons, etc., all depicted as in action. It's a "must" to see if you are ever in Atlanta.

Not only was the entire trip South eminently worthwhile, but it gave us assurance that the vital and important role of the AFCA is thoroughly realized and appreciated among our Southern members.

AFCA. Francis H. Engel, president of AFCA's Washington Chapter and manager of the Washington RCA Victor office, made the presentation at Annapolis on May 31st. The AFCA executive secretary accompanied Mr. Engel to Annapolis for the ceremony.

Military Academy Award

Richard Brownson Keller of Mundelein, Illinois, won the AFCA award at West Point for the highest rating in electricity. Graduating with the second highest academic mark in his class, Cadet Keller was a distinguished military student and received two other prizes at the annual military and academic awards ceremony.

The AFCA prize, similar to the one made at Annapolis, was also donated by Colonel Watts of RCA. The presentation was made by Theodore S. Gary, AFCA's new president, at West Point on June 4th.

ROTC Awards

This spring, the association was proud to present its annual ROTC award to thirty young men who were selected as the outstanding cadets in the advanced course in communications at their respective college or university.

The award, consisting of the AFCA medal, a special citation and a year's membership in the association, recognizes leadership qualifications and proficiency in communications and electronics. It is available to all colleges having ROTC units (Army, Navy and/or Air Force) specializing in communications. Only one award is made at each college. If there are several ROTC units at the college, a board appointed by the college authorities determines the winner.

Next year the association plans to offer a medal to both the basic and advanced communications ROTC students. Details will be supplied in a later issue of SIGNAL.

The future contribution of communications and electronics to our nationl security may well lie in the hands of young Americans like these:

A&M College of Texas

David L. McCausey, Cadet 1st Sgt., Houston, Texas. Last year won the Best-Drilled Sophomore Award for "A" Company, Signal. Attended the 1950 Signal Corps ROTC Summer Camp at Fort Monmouth.

Carnegie Institute of Technology

John K. Stewart, Jr., Pittsburgh, Pa. Member Scabbard and Blade, Pi Tau Sigma, Beta Theta Pi, American Society of Mechanical Engineers; George Westinghouse Scholar; Student Council, Interfraternity Council, Scimitars (honorary activities group), Glee Club, yearbook staff. Worked three summers at Westinghouse Electric Corp. Now em-

ployed as engineer by Bloom Engineering Co., Inc., combustion engineers. Active in ORC, 840th Signal Information and Monitoring Co., Pittsburgh.

Cornell University

Howard R. Hart, Jr., Rome, Georgia. Member Scabbard & Blade, Kappa Sigma; assistant manager basketball. Attended 1949 Signal Corps ROTC Summer Camp at Fort Monmouth.

Georgia Institute of Technology

William H. Muse, Jackson, Tennessee. Member Alpha Tau Omega, Phi Psi textile honorary fraternity, American Association of Textile Chemists and Colorists, AFCA, and 1950-51 Student Council. Designated Distinguished Military Student. Entered the Army after completing one year at Georgia Tech; served with occupation forces in Korea. Resumed studies at Georgia Tech upon discharge from Army in 1948. Will graduate in June 1951.

Iowa State College

Donald L. Reinertson, Cadet Major, Madrid, Iowa. Three years service with the Army Air Force, World War II. Was affiliated with the Communications Fighter Control Systems and was assigned with the 14th Air Force with headquarters at Kunming, China. Majoring in mechanical engineering; will graduate in December 1950. Completed advanced course in communications in Air Force ROTC this June and received appointment in USAF Res. as 2nd lieutenant.

Massachusetts Institute of Technology

Edwin A. Corrie, Cadet Lt. Col., Boston, Mass. Member Theta Chi, Pi Tau Sigma, American Society of Mechanical Engineers, Athletic Association, Intermural Athletic Council and Inter- Fraternity Conference. Three year varsity basketball and golf letterman and captained varsity golf team in senior year. Graduated in mechanical engineering in June and plans to enter Harvard Graduate School of Business Administration in the fall.

Michigan State College

Robert G. Cunningham, Manton, Michigan. Member Pi Tau, Sigma Pi Sigma and Pi Mu Epsilon. Graduated this June with a B.S. in Physics—had a straight A average in military subjects and was commissioned in the Signal Corps Reserve. Was valedictorian of his high school class in 1946 and a member of the Class C state champion high school basketball team.

New York University

William A. Bocchino, Cadet Lt. Col., New York, N. Y. Distinguished Military Graduate, was commissioned in the Regular Army, Signal Corps. Member

Robert Rawson Monroe, Annapolis, receiving AFCA award from Washington chapter president F. H. Engel.

Richard Brownson Keller, winner of the AFCA award at West Point.

Scabbard and Blade, editor of the NYU engineering publication "Quadrangle," and president of the AFCA student chapter at NYU.

North Carolina State College

Frederick O. Smetana, Cadet 1st. Lt., Concord, North Carolina. (No personal data submitted by college.)

Ohio State University

Honer E. Henschen, Cadet Lt. Col., St. Mary's, Ohio. Served on regimental staff of the ROTC unit. Member Scabbard and Blade and Eta Kappa Nu, electrical engineering honorary fraternity.

Kansas State College

Frank L. Westerman, Jr., Great Bend, Kansas. Member Eta Kappa Nu, honorary electrical engineering fraternity. Student chairman of mathematics exhibit at Engineer Open House of 1950. Senior in electrical engineering.

Oklahoma A&M College

James D. Spangler, Oklahoma City, Okla. Member Eta Kappa Nu, Sigma Tau, AIEE and Scabbard and Blade. Commanded the Signal Battalion of the ROTC Cadet Corps and was designated a Distinguished Military Student. Graduated in Electrical Engineering in May and was commissioned a 2nd lieutenant in the Signal Corps Reserve.

Oregon State College

Roland E. Curtis, Cadet Lt. Col., Presidio of San Francisco, Calif. Member Pi Kappa Phi, Scabbard & Blade, AIEE and IRE. Distinguished Military Student; battalion commander. Graduated in June with BA and BS in Electrical Engineering. Attended 1949 Signal Corps Summer Camp at Fort Monmouth.

Purdue University

Arthur C. Hupp, Cadet Major, Fort Wayne, Indiana. Distinguished Military Student, battalion executive; member of Purdue Order of Military Merit, AFCA, AIEE, Cary Radio Club, HKN. Conducted a daily class in international Morse code for both Purdue military and civilian students. Worked for General Electric during 1948 summer vacation as undergraduate engineer in Fort Wayne Works Lab, primarily in sound room. Designated outstanding cadet in his platoon at 1949 ROTC Summer Camp, Fort Monmouth, and selected by Signal Corps Engineering Labs for employment during August 1949. Has held a Class A. FCC Radio Amateur's license for four years. Graduated in Electrical Engineering in June.

Rensselaer Polytechnic Institute

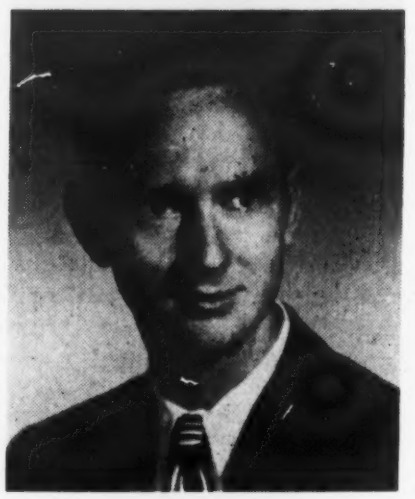
Richard A. Hartunian, Long Island City, N. Y. Entered Army Air Force in July 1945; completed the Airplane and Engines Mechanics course at Keesler Field, Miss., and instructed in the electrical branch of that school for the remainder of his service time of eighteen months. Entered RPI in February 1947 where he majored in physics. Conducted experimental research for his thesis on the determination of an equation of motion of air bubbles rising in liquids. Practical applications of the subject limited to calculations on certain hydraulic pumps, possible analogy to meteorological balloons, and some problems in determining wake effects of ships.

Rutgers University

Warren G. Bender, Cadet Capt., New Providence, N. J. Member IRE, AIEE, American Radio Club, University Rifle Club; staff member WRSU (university

Association Affairs

ROTC Awards: Honer E. Henschen, Ohio State University; Edwin A. Corrie, M.I.T.; Frank L. Westerman, Jr., Kansas State College; Warren G. Bender, Rutgers; Warren E. Hammond, University of Maine; Byrt C. Scammel, Southern Methodist; James D. Spangler, Oklahoma A & M; Robert G. Cunningham, Michigan State; Roland E. Curtis, Oregon State; Richard A. Hartunian, Rensselaer Polytechnic; Baird M. Martin, Virginia Polytechnic; Bruce W. Everitt, University of Illinois; Howard R. Hart, Jr., Cornell; William H. Muse, Georgia Tech.



radio station). Graduated from the School of Electrical Engineering in June and received a commission as 2nd lieutenant in the Signal Corps Reserve. Designated a Distinguished Military Graduate.

State College of Washington

Stuart W. McElhenny, Cadet Lt. Col., Spokane, Wash. Enlisted as a private with the 208 Infantry Battalion in September 1944; sent to Camp Whittier, Alaska, in January 1945; served with the 626 Special Service Group in Alaska in 1946 until discharge as a sergeant in June 1946: Entered State College in September 1946. Distinguished Military Student 1949; Distinguished Military Graduate 1950. Graduated as honor student in May with a BS degree in electrical engineering. Received a Reserve commission in the Signal Corps. Plans to take up graduate work in electronics.

Southern Methodist University

Byrt C. Scammel, Dallas, Texas. Member Scabbard and Blade, IRE, Illuminating Engineering Society; president of AIEE student chapter. Enlisted in Army Aviation Cadet program in December 1943; called to active service July 1943. Eliminated from Cadet Program (air-sickness) after completing pre-flight training. Completed radio school at Truax Field, Madison, Wisc., electronics school at Chanute Field, Ill., and radar school at Boca Raton, Fla. Assigned to B-29 unit to go overseas—unit broken up. Completed radar training at Eastern Signal School at Fort Monmouth. Assigned to sail on troop ship as radar operator when discharged. Graduated from SMU in

May 1950 with BS in electrical engineering. Received reserve commission as communication officer in Air Force. Now employed as electrical engineer at Central Station Alarm Co. in Dallas.

Texas Technological College

William L. Adair, Cadet Lt. Col., Lubbock, Texas. Member Tau Beta Pi; Kappa Mu Epsilon, president; Alpha Chi, president; Phi Eta Sigma; AFCA; Student Association Supreme Court, Student Religious Council, Westminster Fellowship, president; Engineering Society; AIEE, executive council; Engineering Show Council. Distinguished Military Student; battalion commander. Who's Who on the Campus, 1950; Who's Who in American Colleges and Universities, 1950. Eagle Scout, assistant scoutmaster. Military Excellence Award; Achievement Award at ROTC Camp, Fort Monmouth.

University of Alabama

Donald Chirafisi, New York, N. Y. Entered the armed services in 1943 and served four years with the U. S. Navy. Entered University of Alabama in 1948 and graduated in June 1950 with a BS degree. Designated Distinguished Military Graduate and was commissioned in the Signal Corps, Regular Army. Member AFCA student chapter.

University of California

Albert G. Ponte, New Bedford, Mass. Majored in Physics, College of Letters and Science, class of 1950. On graduation was commissioned as a 2nd lieutenant in the ORC.

University of Florida

Robert S. Mogyorosy, Cadet Major, Odessa, Fla. Veteran of World War II, having served with the Army of Occupation in Japan as an Air operations specialists. Majoring in industrial engineering; will graduate next June.

University of Illinois

Bruce W. Everitt, Cadet Lt. Col., Urbana, Ill. Member Eta Kappa Nu, Sigma Tau, Phi Eta Sigma, AIEE, IRE, Sachem (Junior activity honorary), Ma-Wan-Da (Senior activity honorary), Theta Chi. President, The Illini Union, University chairman 1948 homecoming and 1949 spring carnival; Committee on Student Affairs, Student Senate, Coordinations Committee, Military Council; Illini Union Council. Graduated in June with B.S. degree in electrical engineering; plans to attend Harvard Business School in the fall.

University of Kentucky

Carlyle Michelson, Lexington, Ky. In 1945 enlisted in U. S. Navy and attended the Navy Electronics School, Chicago. Discharged in 1946 with rate of Seaman First Class, Electronics Technician. Spent two years at St. Petersburg Junior College, Florida, before attending University of Kentucky. Member Scabbard and Blade and Eta Kappa Nu, and is a radio amateur, Class A. Graduated with a B.S. degree in June. Plans to earn Master of Science degree before launching his career in research and development.

University of Maine

Warren E. Hammond, Cadet Major, Sanford, Maine. A veteran with 32 months service, he served overseas with the 386th Infantry, 97th Division, in the Rhineland and Central Europe campaigns; wears the Combat Infantryman's Badge. Enrolled in the ROTC in September 1948 and completed the advanced course in June 1950. Distinguished Military Student and Distinguished Military Graduate. Received B.S. degree in Engineering Physics and commission as second lieutenant in the Signal Corps Reserve. Will attend Rochester University in fall for graduate study in nuclear physics under an Atomic Energy Commission fellowship.

University of Syracuse

William F. Squires, Cadet 1st Lt., Syracuse, N. Y. Three years service in the Army as a radio repairman and was discharged as a T/4. Saw duty in the Asiatic-Pacific theater; now is a Sgt. 1cl in the ERC. Member AFCA. E.E. Honorary, Tau Beta, and Phi Beta Tau. Designated Distinguished Military Student. Has condensed his Advanced ROTC into one and one-half years and will graduate from Syracuse University (B.S.—E.E) and the Signal ROTC in February 1951.

University of Tennessee

Robert A. Meek, Cadet Lt. Col., West Palm Beach, Fla. Chapter president of Scabbard and Blade; battalion commander in cadet regiment. Member AFCA. Designated Distinguished Military Student. Received regular USAF commission as 2nd lieutenant upon graduation in June.

University of Texas

Gerald B. Bunker, Holland, Texas. Attended Oklahoma A&M College for two years — electrical engineering and Air Force ROTC. Member Phi Eta Sigma, honorary freshmen fraternity; received award to outstanding sophomore in electrical engineering from HKN, national honorary EE society. Transferred to University of Texas in 1948 when parents moved to Texas. Continued in electrical engineering and AF ROTC. Member AIEE and HKN. Designated Distinguished Military Student and Distinguished Military Graduate; commissioned 2nd lieutenant USAFR June 1950. Will receive B.S. degree in January 1951. Attended 1949 Air Force ROTC summer camp at Scott AFB. Started 90 day tour of duty in USAF on June 7, 1950; sent to Carswell Air Force Base, 7th Bomb Wing, 8th AF. Present assignment with 3093d RBS Sqdn as asst. Electronics Officer.

My aching back!—
Again they've got their SIGNALS mixed.
Another sack!—
When'll they get those addresses fixed?
(Can't help it, Mr. Mailman. We keep asking to be notified of changes.)

Address Unknown

Copies of SIGNAL mailed to the below listed members have been returned to us because the latest addresses we have for these names are incorrect. If you know the present address of any of these members please jot it down on a postcard and send it to us.

W. H. Anderson
Paul H. Bacon
Walter C. Blatner
Leon T. Campbell
1st Lt. Millard S. Canter, Jr.
Capt. Estel E. Cohn
Joseph Corig
Lt. Col. Walter F. Dix
Carl P. Dunkel
1st Lt. Claude A. Ernst
Col. Gerritt H. Fletcher
Capt. Arthur M. Fredenburg
Sgt. Ernest T. Gervais
Butler P. Hine, Jr.
1st Lt. William F. Hogan
Lt. Col. Eldon A. Koerner
Maj. George A. Meuer
Philip N. Migal
Walter B. Mitchell
Sgt. Charles A. Montague, Jr.
M/Sgt. Doyle W. Morris
Capt. Charles L. McCandless
Philip L. Newton
Cpl. Harry N. Pasley
Capt. R. J. Price
1st Lt. Philip L. Rancourt
Cpl. Albert Riggs
Maj. Aldred W. Rogers
Norman C. Saunders
Charles H. Taylor
G. F. Thompson
Lt. Col. Thomas K. Trigg
George Van Horn
Lt. Alton R. Wheelock
Lt. Col. John B. Winsted

University of Wisconsin

Robert B. Beaumont, Wausau, Wisc. (Photograph on cover) Veteran of World War II. Enlisted in the Marine Corps June 1943 and served in Hawaii, Iwo Jima and Japan. Honorably discharged at Great Lakes Naval Training Station in May 1946, he entered the University of Wisconsin, majoring in electrical engineering. Active in Scabbard and Blade and intramural athletics; battalion commander. Designated Distinguished Military Student. Accepted appointment as 2nd Lt. in the Signal Corps Reserve June 1950 and plans to accept commission in the Regular Army Signal Corps on receipt of B.S. degree at the end of summer session this August.

University of Wyoming

Carl E. Nelson, Eden, Wyoming. Entered the university on a four year County Commissioner's scholarship. Varsity rifle team for four years and Air Force ROTC rifle team captain in 1950. Member IRE, Sigma Tau, Acacia fraternity. President of the Arnold Society of Air Cadets in 1950. Designated Distinguished Military Graduate. Received B.S. degree in electrical engineering this June.

Utah State Agricultural College

Thomas E. Urie, Cadet Lt.., Cedar City, Utah. Served 2½ years in the Air Force from October 1943 to February 1946 as a radio mechanic. Executive Officer of the Air Force's Wing of the Brigade of Cadets; member AFCA. Attended AF ROTC Summer Camp at Scott AFB, Illinois, in 1949. Maintained a straight "A" average during the Air Force ROTC communications course. Designated Distinguished Military Student and was tendered a regular appointment in the Air Force upon graduation in June.

Virginia Polytechnic Institute

Baird M. Martin, Cadet 1st Lt., Oak Hill, W. Va. Member Tau Beta Pi, Eta Kappa Nu, Pershing Rifles, Scabbard and Blade, Arnold Society of Air Cadets. VPI Cadet Band, Smokeless Coal Club; intramural softball and football. Electrical engineering major. Designated Distinguished Military Student.

ROTC Summer Camp Awards

In addition to the above, awards were made to the outstanding cadet at the Air Force Communications ROTC Summer Camp at Scott Air Force Base, Ill., and at the Signal Corps Summer Camp at Fort Monmouth, N. J.

The winner at each camp received the AFCA medal, a special citation, a year's membership in the association and an AFCA lapel button for civilian wear.

The outstanding cadets at this year's summer encampments were:

Fort Monmouth

Wilbur J. Jensen, Rutgers University The presentation was made by Brig. Gen. C. O. Bickelhaupt (Ret.), National AFCA Vice President and Vice President of American Telephone and Telegraph Company, during the final review closing out the six weeks of specialized training in communications.

Scott Air Force Base (Ill.)

George A. Lovell, Jr., Waterloo, Iowa. Attending Iowa State College, general engineering course. Active in Radio broadcasting. Member of Amateur Radio Club, Military Society, Kappa Sigma, Pershing Rifles, Scabbard and Blade.

AFCA GROUP MEMBERS

Communications—Electronics—Photography

Listed below are the names of the American firms who are group members of the Armed Forces Communications Association. By their membership they indicate their readiness for their share in industry's part in national security. Each firm nominates several of its key employees or officials for individual membership in AFCA, thus forming a group of the highest trained men in the electronics and photographic fields, available for advice and assistance to the armed services on research, development, manufacturing, procurement, and operation in our special fields.

Acme Telecronix
American Institute of Electrical Engineers
American Phenolic Corporation
American Radio Institute, Inc.
American Radio Relay League
American Steel & Wire Company
American Telephone & Telegraph Co.
Anaconda Wire & Cable Company
Arnold Engineering Company
Astatic Corporation
Automatic Electric Company
Automatic Electric Sales Corp.

Baltimore News Post
Barry Corporation, The
Bell Telephone Company of Pa.
Bendix Radio
Bliley Electric Company
Breeze Corporation, Inc.
Burnell & Company

California Water & Telephone Co.
Capitol Radio Engineering Inst., Inc.
Carolina Telephone & Telegraph Co.
Central Radio and Television Schools
Chesapeake & Potomac Tel. Co.
Cincinnati & Suburban Bell Tel. Co.
Collins Radio Company
Copperweld Steel Company
Cornell-Dubilier Electric Corp.
Corning Glass Works
Coyne Electric School, Inc.

Diamond State Telephone Co.

Eastman Kodak Company
Eby, Inc., Hugh H.
Electronic Associates, Inc.
Electronic Designs, Inc.
Espey Manufacturing Co., Inc.

Federal Mfg. and Engineering Corp.
Federal Telephone & Radio Corp.

General Aniline & Film Corp.
General Cable Corporation
General Electric Company
General Instrument Corp.
General Telephone Corp.
Gilfillan Bros., Inc.
Gray Manufacturing Co.

Hallicrafters Company
Haloid Company
Hazeltine Electronics Corp.
Heinemann Electric Company
Hercules Motors Corp.
Hoffman Radio Corp.

Ilex Optical Co.
Illinois Bell Telephone Co.
Indiana Bell Telephone Co.
Indiana Steel & Wire Co.
Institute of Radio Engineers
International Resistance Co.
International Tel. & Tel. Corp.

Jacobsen Manufacturing Co.

Kellogg Switchboard & Supply Co.
Kleinschmidt Laboratories, Inc.

Lavoie Laboratories
Leich Sales Corporation
Lenkurt Electric Company, Inc.
Lewyt Corporation

Machlett Laboratories, Inc.
Magnavox Company
Mallory & Co., Inc., P.R.
Merit Transformer Corp.
Michigan Bell Telephone Company
Motorola, Inc.
Mountain State Tel. & Tel. Co.

National Carbon Company, Inc.
New England Tel. & Tel. Co.
New Jersey Bell Telephone Company
New York Telephone Company
North American Philips Co., Inc.
Northwestern Bell Telephone Co.

Oak Manufacturing Co.
Ohio Bell Telephone Co.
O'Keefe & Merritt Company
Operadio Manufacturing Company

Pacific Telephone & Telegraph Co.
Philco Corporation
Photographic Society of America

Radiart Corporation
Radio Condenser Company
Radio Corporation of America
RCA Victor Division
Ray-O-Vac Company
Reeves Instrument Corp.
Remington Rand, Inc.
Rola Company, Inc.

Saxonburg Potteries
Sherron Electronics Co.
Smuckler & Company, Inc., A. F.
Society of Motion Picture Engineers
Sonotone Corporation
Southern Bell Tel. & Tel. Co.
Southern New England Tel. Co.
Southwestern Bell Telephone Co.
Sperry Gyroscope Company
Stackpole Carbon Company
Stupakoff Ceramic & Mfg. Co.
Sylvania Electric Products, Inc.

Telephone Services, Inc.
Telephonics Corporation
Teletype Corporation
Times Facsimile Corporation
Tung-Sol Lamp Works, Inc.

United Radio Television Institute
United States Rubber Company

Western Electric Company, Inc.
Western Union Telegraph Co.
Westinghouse Electric Corp.
Weston Electrical Instrument Corp.
Willard Storage Battery Company
Wisconsin Telephone Company
Wollensak Optical Company

ARMED FORCES COMMUNICATIONS ASSOCIATION

1624 Eye Street, N.W.
Washington 6, D. C.

CONSTITUTION and BY-LAWS

Adopted April 29, 1947

Revised
May 11, 1948
March 28, 1949
May 12, 1950

For the information of our members there is published here our Association's Constitution and By-Laws to include latest revisions made at the 1950 Annual Meeting, May 12th, at New York City.

Separately printed copies of the Constitution and By-Laws will be mailed to any member of the Association upon request.

PREAMBLE

The Armed Forces Communications Association, organized in 1946 and incorporated under the laws of the District of Columbia, is a national society of American citizens working toward national security in the fields of communications, electronics and photography.

The Association endeavors to maintain and improve the cooperation between the Armed Forces and Industry in communications, and in the design, production, maintenance and operation of communications, electronics and photographic equipment in time of peace as well as in time of war.

The principal objective of the Association is an active membership of American citizens to whom the responsibility of training, production, maintenance and operation of this type of equipment falls in time of peace as well as in time of war.

The Association is entirely patriotic and non-sectarian; it has no commercial interests and no political alliances. It is not operated for profit and its income is expended in furthering its aims and purposes. Its elected officers serve without remuneration. All American citizens are eligible to membership.

SIGNAL, the journal of the Association, is published for the purpose of disseminating chapter news and other information of interest and importance to the members.

ARTICLE I
NAMES AND LOCATION

Sec. 1. The name of the Association shall be the Armed Forces Communications Association.

Sec. 2. The executive offices of the Association shall be in the City of Washington, District of Columbia.

ARTICLE II
MEMBERSHIP

Sec. 1. Membership in the Association shall be open to American industrial organizations and to all men and women who are American citizens and who are interested in furthering the objectives of the Association, with honorary memberships offered to certain citizens of foreign countries.

ARTICLE III
GOVERNMENT AND OFFICERS

Sec. 1. The government of the Association shall be vested in the Board of Directors, which may exercise all powers and do all such things as may be exercised or done by the Association, but subject, nevertheless, to the provisions of the statutes of the District of Columbia, the Certificate of Incorporation of the Association, and the Constitution and By-laws of the Association.

Sec. 2. The Board of Directors shall consist of 24 members, elected by the Council, each to serve without pay for a term of four years, and divided into four classes of six members each, one class to retire at the end of the annual meeting each year, or upon the election and qualification of their successors. The Board of Directors shall have the power to fill casual vacancies in its membership and in all national offices of the Association, and to initiate executive measures necessary to achieve the objectives of the Association. The Board shall meet at least once each year, at the same time and place as the annual convention of the Association.

Sec. 3. The officers shall consist of a president, a first vice president, a second vice president and such additional number of vice presidents, not to exceed three, as may be authorized by the Board of Directors, and shall serve without pay. All officers (with the exception of the Counsel and the Executive Secretary) shall be elected by the Board of Directors at its annual meeting, from the active membership of the Board, to take office at the end of the annual meeting at which they are elected, and to serve for a term of one year following their election, or until their successors are elected and qualify.

Sec. 4. The Board of Directors shall at its annual meeting elect a Counsel to serve without pay for a term of one year beginning at the end of the meeting at which he is elected, or until his successor is elected and qualifies.

Sec. 5. The Board of Directors shall at its annual meeting appoint an Executive Secretary and Treasurer to serve for a term of one year beginning at the end of the meeting at which he is appointed, or until his successor is appointed and qualifies, and shall fix his annual salary for such period.

Sec. 6. Regular Service personnel shall not be eligible to hold a paid national office in the Association while on active duty status.

Sec. 7. The Council of the Association shall consist of the members of the Board of Directors and one representative for each 100 members or fraction thereof in each chapter, provided however that no chapter shall have less than two chapter representatives, elected by the chapter members for a period of one year beginning on April 1st of each year. The national president of the Association, or in his absence the senior vice president present, shall serve as Council chairman.

The functions of the Council shall be to elect the Board of Directors and Honorary Members, and to make recommendations with reference to any proposed amendments to the Constitution. Chapters shall have power to fill unexpired terms of their Council representatives. The Council shall meet once each year at the time and place of the annual convention of the Association and at the hour designated by the Executive Committee. A majority vote of the members of the Council present shall be necessary for election to the Board of Directors. Members of the Council are eligible to be present at the annual meeting of the Board of Directors and to participate in the discussions, but shall not have the power to vote.

Sec. 8. There shall be an Executive Committee which shall consist of the President, the immediate Past President, and three other members of the Board, to be elected by the Board of Directors at its annual meeting for a term of one year beginning at the end of the annual meeting at which they are elected. The Counsel and Executive Secretary shall be eligible to attend meetings of the Committee, but shall have no vote.

The Executive Committee shall meet at least once each quarter, and at the call of the President or of any three of its members. It shall exercise the powers set forth in the Constitution and By-laws, also the powers of the Board of Directors between meetings of that Board. All actions taken by the Executive Committee shall be ratified by the Board of Directors at its next subsequent meeting. The Executive Committee shall have the power to fill vacancies for unexpired terms. Notice in writing of the time and place of each meeting of the Executive Committee shall be sent to all members of the Committee at least ten (10) days prior to the meeting date.

Sec. 9. Special meetings of the Board of Directors may be called by the President, the Executive Committee, or any three members of the Board of Directors. Notices of such meetings shall be in writing and shall state the time and place of the meeting, and shall be sent to all Directors at least ten (10) days prior to the meeting date.

Sec. 10. Qualification of Directors and others shall be by acceptance within thirty (30) days by the Director or other persons elected or appointed.

Sec. 11. A quorum of the Council shall consist of 11 members; of the Board of Directors, 9 members; and of the Executive Committee, 3 members.

ARTICLE IV
MEETINGS

Sec. 1. The Association shall hold an annual meeting in the spring of the year at a time and place to be designated by the Executive Committee, which will cause to be prepared a program to include, when possible, the demonstration of such military and industrial communication, electronic and photographic equipment and training as may be authorized.

Sec. 2. The Association may hold such special meetings as may be called by the President or the Board of Directors or the Executive Committee.

ARTICLE V
CORPORATE OBLIGATIONS

Sec. 1. No obligation shall be incurred on behalf of the Association except by the Executive Secretary or by his written authorization and then only to the extent of funds in the Treasury available to meet the obligation. All obligations incurred by the Corporation shall be solely corporate obligations and no personal liability whatsoever shall attach to, or be incurred by, any member, officer or director of the Corporation by reason of any such corporate obligation.

ARTICLE VI
AMENDMENTS

Sec. 1. Amendments to this Constitution may be proposed by a majority vote of the Board of Directors or of the Executive Committee or upon petition addressed to the President and signed by not less than five percent of the total number of full members.

Sec. 2. Proposed amendments shall be submitted to the Council at any annual or special meeting for discussion and recommendations after which they shall be referred for final action to the Board of Directors, which may adopt them by a majority vote of the Directors present at any duly convened annual or special meeting at which a quorum is present.

BY-LAWS

1. AIMS AND PURPOSES

a. To preserve and foster the spirit of fellowship among former, present and future communications, electronics and photography personnel of Industry and the Armed Forces.

b. To commemorate the services rendered by the communication, electronic and photographic industries and of industrial personnel, and by the military personnel assigned to these activities in the wars in which the United States has been or may become engaged.

c. To promote efficiency in military communications, electronics and photography, especially through better liaison between Industry and the Armed Forces, as well as among the three Services themselves. This will include the maintenance of close relations between civilian scientists, engineers, manufacturers and operatng companies and those concerned with similar activities in military, naval and air force communications, electronics and photography.

d. To bring to the attention of the membership through chapter meetings and the Association magazine, the importance of thorough cooperation between Industry and the Armed Forces in the communications, electronics and photographic fields.

e. To encourage adequate military training throughout the Nation, the upbuilding of adequate enlisted and commissioned National Guard and Reserve forces, and effective industrial preparedness for war, in the fields of communications, electronics and photography.

2. CLASSES OF MEMBERSHIP

a. FULL MEMBERSHIP in the Association shall be open to all American citizens interested in advancing the aims of the Association especially in communcation, electronic and photographic phases thereof. Present and former military personnel and civilians employed in the electronic, photographic and communication industries, will be especially encouraged to become full members.

b. LIFE MEMBERSHIP in the Association shall be open to all men and women who are American citizens and who are interested in promoting the objectives of the Association. Life membership shall continue during the lifetime of the life member and shall expire at his death. It shall not be transferable.

c. STUDENT MEMBERSHIP in the Association shall be open to all men and women who are American citizens and who are students in the service academies, schools and colleges, and for one year after graduation.

d. GROUP MEMBERSHIP in the Association shall be open to all firms and companies controlled by American citizens who are interested in promoting the cause of industrial preparedness particularly in connection with communications, electronics and photography, and with research, development, production, manufacture, operation and supply of communication, electronic and photographic equipment. Group members shall have the privilege of nominat-

ing ten of their employees or officials who are American citizens, for full membership in the Association, and members thus nominated shall pay no individual dues.

e. HONORARY MEMBERSHIP in the Association may be proposed by at least three full or life members of the Association and a favorable vote by a majority of the Council voting shall be necessary for election.

Honorary Life membership shall be extended to all former Chief Signal Officers of the Army and Directors of Naval, Air, and Coast Guard Communications and the Defense Department Directors of Communications, and shall be extended to the active officers in these positions as soon as they assume office.

Honorary membership shall be extended to the Chairman of the Joint Chiefs of Staff and to the Chiefs of Staff of the several Services during their tenure of office, and to such other public officials as the Executive Committee may direct.

Citizens of foreign countries are eligible to Honorary Membership, either as Life Honorary or as annual Honorary Members, provided that if such a member later becomes a citizen of the United States of America his membership shall automatically change from Honorary to Life or Full, as the case may be.

Honorary members shall be entitled to all privileges of full membership except as otherwise provided in the Constitution and in these By-laws.

3. MEMBERSHIP INFORMATION—GENERAL

a. The term "members" except where specifically stated otherwise in the Constitution and in these By-laws shall mean full and life members only. Only these may vote or hold office.

b. The election to membership of all classes shall be by action of the Executive Committee, and the decision of that Committee as to eligibility shall be final.

c. Any person desiring to become a member shall make written application to the Executive Secretary. Said application shall be in such form and contain such data as may be prescribed by the Executive Secretary or the Membership Committee, in either case subject to the subsequent approval by the Executive Committee.

d. Any member may withdraw from the Association at any time by tendering his resignation in writing, but such resignation shall not become effective until said member shall have paid all obligations due the Association from him at the time of such resignation.

e. Any member may be dropped for cause by the vote of three members of the Executive Committee or, having been dropped, may be reinstated at the discretion of the Executive Committee.

f All members are entitled to receive one copy of the Association publication for which $3.00 of the annual dues are charged—except that the entire $2.00 of student dues is for the publication.

4. MEMBERSHIP DUES

a. The fee for life membership in the Association shall be one hundred dollars (100.00) except for students in technical schools and the U. S. Military, Naval and Coast Guard academies for which the fee will be fifty dollars ($50.00).

b. The annual dues for membership in the Association shall be:
For *full members*, five dollars ($5.00).
For *student members*, two dollars ($2.00).
For *group members*, two hundred dollars ($200.00), except for small business firms (with 500 or fewer employees) for which the annual dues are one hundred dollars ($100.00).

5. OFFICERS

a. The President shall have general supervision of the affairs of the Association and shall perform the duties usual to his office. He shall preside at the meetings of the Council, of the Board of Directors, and of the Executive Committee. He shall be *ex officio* a member of all committees and of all subcommittees thereof. In the absence of the President his duties shall devolve upon the Vice Presidents in order of seniority.

b. The First Vice President shall have general charge of memberships and the activities of local chapters.

c. The Second Vice President shall have general charge of the activities of the National Advisory Committees.

d The Counsel shall be the legal advisor to the Executive Secretary, the National Officers, the Executive Committee, and the Board of Directors.

e. The Treasurer shall be the custodian of the funds of the Association under the direction of the Executive Committee. He shall render an annual report and such special reports as may be called for by the Executive Committee. The accounts of the Association shall be audited annually by independent auditors. However, in the discretion of the Executive Committee, a certified public accountant designated by it may conduct the annual audit, his report to be made to the Executive Committee.

f. The Executive Secretary shall make collections and disbursements under the supervision of the Executive Committee; shall keep the roster of the members and the records of the status of annual dues; shall be the keeper of the seal of the Association; and shall have the custody of correspondence and records. He shall be responsible that suitable arrangements are made for the annual and other meetings of the Association, of the Council, of the Board of Directors, and of the Executive Committee, the proceedings of which he shall record. He shall submit an annual report to the Board of Directors at its annual meeting, and a quarterly report at the specified quarterly meetings of the Executive Committee.

The Executive Secretary shall be responsible for hiring and discharging the necessary National Headquarters personnel and for the management of the Executive Offices and shall have the power to contract in the name of the Association for such services and supplies as are necessary for its operation. He shall have administrative charge of the activities and national programs of the Association, of the Association's magazine SIGNAL, and of all other Association publications.

6. FISCAL YEAR

a The fiscal year shall close on March 31, 1951 and on March 31 of each year thereafter.

7. CHAPTERS

a Upon petition stating that not less than twenty-five (25) members of the Association in any locality desire to form a local chapter for the more intimate achievement of the purposes of the Association, the Executive Secretary of the Association shall immediately authorize a meeting for such inauguration, and assist in every way possible toward the organization of such chapter.

b. Upon the formation of a new chapter, the Association will issue a suitable charter, signed by the National President and the Executive Secretary of the Association.

c. Every member of the Association, unless he desires otherwise, will automatically become a member of the local chapter of the territory in which he resides, but no person shall be a member of a local chapter who is not a member of the Association.

The local chapter may collect annually all dues, both original and renewal, for all of its individual and group members. The sum of $5.00 for each full member may be sent to National Headquarters, $1.00 of which will later be returned to the chapter. Or the sum of $1.00 may be withheld by the chapter for each full member and the remaining $4.00 remitted with the application form submitted by the member.

The annual group membership fee of $200.00 ($100.00 in case of small business), either original or renewal, shall be remitted to National Headquarters, and $50.00 (10.00 in the case of small business) shall be distributed quarterly by National Headquarters to chapters, on a pro rata basis of paid membership at the end of the quarter previous to that in which the payment is made.

d The constitution and by-laws of each local chapter shall be in the general form of that of the Association and shall be submitted to the Executive Secretary of the Association for review and shall be approved by him before becoming effective.

e. It shall be the general purpose of the chapters of the Association to bring their individual and group members into a closer fellowship with each other and with the communication, electronic and photographic personnel of the Armed Services. This can be accomplished through the medium of chapter meetings, visits to military establishments, industrial plants and laboratories, and through seminars and discussions consistent with the national policies and objectives of the Association.

f. Sub-chapters or posts may be organized by chapters of the Association. Such sub-chapters or posts will be chartered by the parent chapter with an initial membership of at least five members of the Association in good standing. All applications and dues of such members will continue to be handled by the National Headquarters.

g. Student charters may be organized at any college or university in the United States which carries electronics or communications courses in its curriculum.

A minimum of 10 student members may file petition for a student charter. This charter will be issued by National Headquarters in accordance with Sec. b of this By-law.

8. RESTRICTIONS

a. No member of the military establishment of the Army, Navy, Air Force, or Coast Guard shall be employed by the Association in a paid capacity, except that articles written for publication may be paid for with the approval of the Executive Secretary.

9. NOMINATIONS AND ELECTIONS

a On or before March 1st each year the President shall appoint a nominating committee, composed of not less than three nor more than five members of the Association. This committee shall draw up a slate of nominations for members of the Board of Directors to fill the vacancies which will occur in that year. On or about March 1st the Executive Secretary shall notify all Directors and Council representatives that nominations for new Directors are in order and shall request that the Council members submit to the chairman of the nominating committee such names as they desire to nominate for the Director vacancies to be filled.

Any group of twenty or more members in good standing of the Association may submit to the chairman of the nominating committee the name of a candidate or list of candidates, for membership on the Board of Directors. Such a petition shall be in the hands of the nominating committee at least four weeks before the annual meeting. If any person or persons so proposed is not included by the nominating committee in its list of nominations, then any member of that group proposing such person or persons may place his or their names in nomination before the Council at the same time as the names of those nominated by the nominating committee. No other person shall be voted upon or eligible for election as a director. Those candidates receiving the highest number of votes shall be declared elected.

After the nominees are selected and after ascertaining if the proposed candidates will accept the posts indicated, the chairman of the nominating committee will submit the list of candidates for directors, at the annual meeting of the Council for appropriate action.

The officers of the Association will then be elected by the Board of Directors at their annual meeting. A majority of the Directors present shall be necessary for the election of any officers or member of the Executive Committee.

10. AMENDMENTS

a. The Board of Directors shall have the power to adopt and amend the By-laws by a majority vote of those present at any annual or special meeting of the Board.

11. INSIGNIA

a. The insignia or emblem of the Association shall consist of:

1. The central figure is an alert powerful American eagle with strong talons clutching lightning flashes—symbolic of a strong America insofar as national defense and especially modern communications are concerned—our basic reason for existence. The border consists of leaves of the olive branch of peace showing that the object of military preparedness in America is to assure a lasting peace. In the background are signal flags—the first means of signaling in the U. S. Signal Corps and a method still used for special purposes by the Navy. Just above the eagle and between his outstretched wings, is a heavy bomber in flight, symbolizing the complicated and essential communications in the Air Force, Marine and Naval aviation, both intra- and inter-aircraft, air-ground and on the ground. Above that is a radar antenna array and at the very top a radio relay antenna—for the latest major step in military communications. In the color version there are the traditional colors of the signal flags—dexter white flag with red center and sinister red flag with white center —with a gold border to the whole.

2. Insignia in this form with ribbon and modifications of it in the form of pins, badges, buttons and rings, shall be authorized by the Board of directors for use of members. The ribbon shall be in two equally wide stripes of orange and blue.

b. The flag of the Association shall be the above insignia superimposed upon a field of sky blue cloth —representing the medium through which modern signals are transmitted. Under the insignia shall be a scroll on which shall be inscribed "National Security through Military Preparedness."

12. NATIONAL ADVISORY COMMITTEES

a. Members of the Association shall be eligible for membership on National Advisory Committees devoted primarily to the problems of the Armed Services and to the advancement of knowledge, engineering practices and production and design techniques relating to the special fields of communications, electronics or photography and to activities of the Association.

b. These committees shall be organized in conformity with conditions in each particular field rather than according to any standard pattern.

c Each committee shall have a chairman selected by the President of the Association and approved by the Executive Committee. The other members shall be designated by the chairman. Through meetings, conferences and discussions and in cooperation with local chapters, they shall keep the membership in close contact with progress and developments in their specific fields. They shall meet as committees from time to time to initiate recommendations or reports and shall be available in an advisory capacity on such matters as may be presented for their study and report by the Armed Forces or the Association.

CHAPTER NEWS

National Director of Chapters: W. W. Watts, RCA Victor Div., Camden, N. J.

AREA REPRESENTATIVES FOR CHAPTERS

Area A: William H. Harrington, 195 Broadway, New York 7, N. Y. *New England States, New York, New Jersey*
Area B: J. H. LaBrum, Packard Building, Philadelphia, Pa. *Delaware, Kentucky, Maryland, Ohio, Pennsylvania, West Virginia and Virginia*
Area C: W. H. Mansfield, So. Bell T&T Co., Atlanta, Ga. *Southeastern States along Atlantic and Gulf coasts—from North Carolina to Louisiana including Tennessee*
Area D: Lury B. Redmond, 6106 Victor St., Dallas, Tex. *New Mexico, Texas, Oklahoma, Arkansas*
Area E: T. S. Gary, 1033 W. Van Buren St., Chicago, Ill. *Michigan, Indiana, Illinois, Wisconsin, Minnesota, Iowa, Missouri, Kansas, Nebraska, North Dakota, South Dakota, Wyoming, Colorado*
Area F: H. L. Hoffman, 3761 S. Hill St., Los Angeles, Calif. *Arizona, Utah, Nevada, California, Idaho, Oregon, Montana and Washington*

CHAPTERS: PRESIDENTS AND SECRETARIES

ATLANTA: President—Ralph S. Grist, Southern Bell Tel & Tel Co., Hurt Bldg., Atlanta, Ga. Secretary—Capt. R. L. Oertle, SigSec, Hqs 3rd Army, Ft. McPherson, Ga.

AUGUSTA-CAMP GORDON: President—Henry J. Hort, SCTC, Camp Gordon, Ga. Secretary — P. K. Jones, Southern Bell Tel & Tel Co., Augusta, Ga.

BALTIMORE: President — Wilbur L. Webb, 5710 Kenmore Rd., Baltimore, Md. Secretary — George C. Ruehl, Jr., 1 Tanglewood Rd., Baltimore, Md.

BOSTON: President—T. F. Halloran, General Communication Co., 530 Commonwealth Ave., Boston, Mass. Secretary — James E. Foster, Asst. PMS&T, M.I.T., Cambridge, Mass.

CHICAGO: President — Oliver Read, Radio News, 185 N. Wabash Ave., Chicago, Ill. Secretary — Raymond K. Fried, 111 W. Monroe St., Chicago, Ill.

CLEVELAND: President — Lee J. Shaffer, 820 Superior Ave., N. W., Rm. 205, Cleveland, Ohio. Secretary—T. F. Peterson, American Steel & Wire Co., 1434 Union Commerce Bldg., Cleveland, Ohio.

DALLAS: President (acting)—Warren S. Hatfield, Southwestern Bell Tel Co., Dallas, Tex. Secretary (acting)—Lury B. Redmond, 6106 Victor St., Dallas, Tex.

DAYTON-WRIGHT: President — Edward H. Bobzean, Ohio Bell Tel Co., 215 W. 2nd St., Dayton, Ohio. Secretary — Philip H. Johnson, 2028 Colonial Village Lane, Dayton, Ohio.

DECATUR: President—Robert C. McMurtrey, 2400 Kirby Court, Decatur, Ill. Secretary — Edward C. Whitcomb, 2912 E. Wood St., Decatur, Ill.

EUROPEAN: President—I. P. Doctor, SigO, Frankfurt Mil. Post, APO 757, New York. Secretary—C. E. Laurendine, Comm. Gp., Bi-Partite Control Office, APO 757, New York.

FAR EAST: President — George I. Back, Sig Sec, GHQ, FEC, APO 500, San Francisco, Calif. Secretary — Luster R. Kleinknight, Sig Sec, GHQ, FEC, APO 500, San Francisco, Calif.

FORT MONMOUTH: President—J. D. O'Connell, 15 Allen Ave., Fort Monmouth, N. J. Secretary—Huston E. Maxwell, SigCorps Board, Fort Monmouth, N. J.

GREATER DETROIT: President — E. C. Balch, Michigan Mell Tel. Co., 333 State St., Detroit, Mich. Secretary—Leo J. Ritter, 16526 Vaughan, Detroit, Mich.

KENTUCKY: President — Robert H. McAteer, 1062 E. Cooper Drive, Lexington, Ky. Secretary — Clyde T. Burke, Lexington Signal Depot, Lexington, Ky.

LOUISIANA: President—Peter M. Miller, Jr., 1936 Robert St., New Orleans, La. Secretary—A. Bruce Hay, Southern Bell Tel & Tel Co., 520 Baronne St., New Orleans, La.

NEW YORK: President — Thompson H. Mitchell, RCA Communications, Inc., 66 Broad St., New York, N. Y. Secretary — David Talley, International Tel & Tel Corp., 67 Broad St., New York, N. Y.

PHILADELPHIA: President — W. W. Watts, RCA Victor Div., Camden, N. J. Secretary—Joseph Bergman, Sig Corps Stock Control Agency, 2800 So. 20th St., Philadelphia, Pa.

PITTSBURGH: President — Fred E. Moran, Western Union Telegraph Co., 710 Smithfield St., Pgh, Pa. Secretary — Andrew N. Galone, Peebles Rd., RD 1, Allison Park, Pa.

RICHMOND: President—E. T. Maben, Chesapeake & Potomac Tel Co., 703 E. Grace St., Richmond, Va. Secretary—Lelia V. Fussell, Chesapeake & Potomac Tel Co., 703 E. Grace St., Richmond, Va.

SACRAMENTO: President — M. G. Mauer, 2320 Ralston Rd., Sacramento, Calif. Secretary — C. A. House, Sacramento Signal Depot, Sacramento, Calif.

ST. LOUIS: Acting President—G. E. Popkess, Jr., 35 Lindorf Drive, E. St. Louis, Ill. Acting Secretary—Henry C. Hughes, 915 Golf Course Dr., University City, Mo.

SAN FRANCISCO: President — Harry E. Austin, RCA Communications, Inc., 28 Geary St., San Francisco, Calif. Secretary — William G. Damerow, 1625 Pacheco St., San Francisco, Calif.

SEATTLE: President — Clarence D. Lawrence, 5336 Hazel St., Seattle, Wash. Secretary — Clarence C. Bodine, 6812 Phinney Ave., Seattle, Wash.

SOUTH CAROLINA: President—John L. H. Young, 34 Chalmers St., Charleston, S. C. Secretary — Carl A. Newman, 348 Mills Ave., Spartanburg, S. C.

SOUTHERN CALIFORNIA: President—Arthur C. Hohmann, City Hall, Los Angeles, Calif. Secretary—Richard F. Walz, 5808 Marilyn Ave., Culver City, Calif.

WASHINGTON: President — Francis H. Engel, RCA Victor Div., 1625 K St., N. W., Washington, D. C. Secretary — Edward C. Cover, Chesapeake & Potomac Tel Co., 725 13th St., N. W., Washington, D. C.

STUDENT CHAPTERS

CORNELL UNIVERSITY, Ithaca, N. Y.

NEW YORK UNIVERSITY: President—William A. Bocchino, 2007 Sedgwick Ave., University Heights, N. Y. Secretary—Robert E. Buckley, 2007 Sedgwick Ave., University Heights. N. Y.

OKLAHOMA A & M COLLEGE, Stillwater, Okla.

STATE COLLEGE OF WASHINGTON, Pullman, Wash.

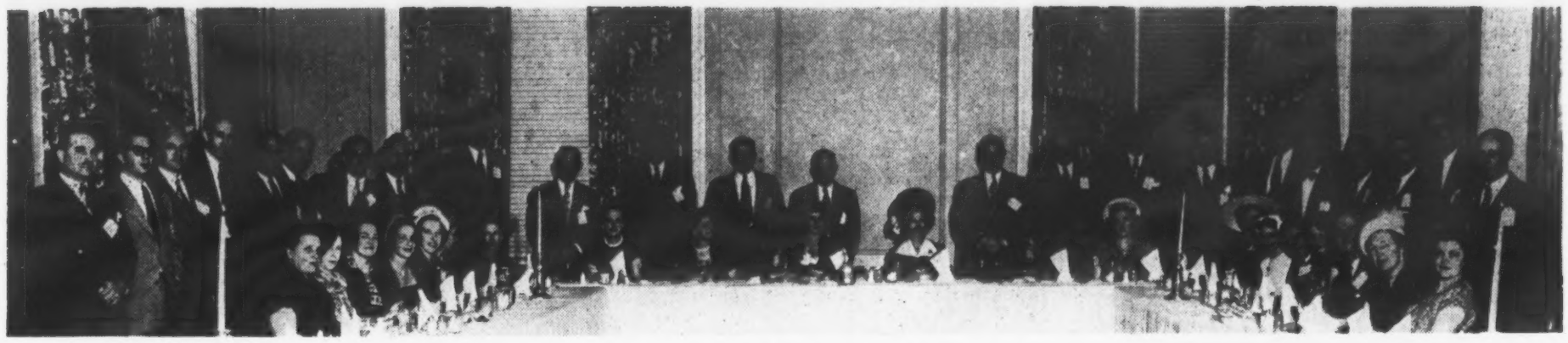
TEXAS TECHNOLOGICAL COLLEGE: President—Thomas C. Penn, West Hall, Texas Tech, Lubbock, Tex. Secretary — M. G. Harris, Texas Tech, Lubbock, Tex.

UNIVERSITY OF ALABAMA: President—Butler P. Hine, Jr., PO Box 5305, University, Ala. Secretary — Emory W. Morris, PO Box 3009, University, Ala.

UNIVERSITY OF CALIFORNIA, Berkeley, Calif.

UTAH STATE AGRICULTURAL COLLEGE: President—Marvin H. Stoneberg, 290 N. 2nd E., Logan, Utah. Secretary—George L. Beutler, 133 E. Center, Smithfield, Utah.

NATIONAL HEADQUARTERS CHAPTERS SECRETARY: JULIA B. GODFREY



Pittsburgh Chapter meeting and annual banquet at the Hotel William Penn. AFCA Executive Secretary George P. Dixon spoke, and officers were elected for the ensuing year.

CHAPTER NEWS

Atlanta

Ralph S. Grist. General Coordinator of Military Services. Southern Bell Telephone & Telegraph Company. was installed as president of the Atlanta chapter at its annual meeting on June 5th.

Major General William C. Chase. chief of staff. Third Army. and formerly commanding general of the famous First Cavalry Division was guest speaker at the dinner meeting held at the officers' mess. Fort McPherson. General Chase was introduced by Lt. General Alvan C. Gillem. Jr.. commanding general. Third Army. Both stressed the importance of communications in all phases of war and in peace and paid high tribute to the AFCA as being a means of bringing together the civilian and military "know-how" of all branches of communications and welding them into an organization that should prove of tremendous value in the event of national emergency. General Chase gave a very interesting and informative talk on the Far East.

Other chapter officers installed were: 1st vice-president—H. S. Dumas, Jr.. Dealers Supply Co.; 2nd vice-president—Lt. Col. Clyde R. Smith. Signal Section. Third Army; 3rd vice-president—John F. Harte. Jr.. Georgia Tech; 4th vice-president—Robert J. Smith. Conley General Depot; secretary-treasurer—Capt. Robert L. Oertle. Signal Section. Third Army.

Augusta-Camp Gordon

The importance of communications to the dissemination of prompt and accurate news to the people of the United States was emphasized at the June 28th chapter meeting at Camp Gordon. The newspaper phase was presented by guest speakers John R. Henry. southeastern regional manager of International News Service. and Ken Opstein. sports editor. INS. Chicago.

Forty-five members and guests attended the meeting and the dinner which preceded it at the officers' club.

The chapter continues to hold regular meetings during the summer when most other chapters suspend activities. The July 27th meeting took place at Sheraton Bon-Air Hotel in Augusta. Plans were announced for the August meeting which will feature a conducted tour of the Southern Bell plant at Augusta.

The guest speaker of the evening was Lieutenant Griffith of the signal training regiment of Camp Gordon. who recently returned from Korea. He gave a most interesting talk on the current situation and his adress was followed by Signal Corps movies taken in Korea.

At the conclusion of the program. the members and guests adjourned to the pent-house for a buffet supper. Informal conversation. stimulated by an occasional draft of beer. wound up the evening.

The officers and directors of the Augusta-Camp Gordon Chapter held a luncheon meeting at noon August 3rd. at the Camp Gordon officers' club. The meeting was occasioned primarily by the presence of Colonel George P. Dixon. AFCA National Executive Secretary. who stopped briefly at Camp Gordon en-route to Atlanta.

In addition to Colonel Dixon, those present included: W. H. Mansfield. AFCA national director, Ralph Grist of Southern Bell Telephone Co. of Atlanta; Charles Eberhart, Marion Symms and Hugh Fleming. all of Southern Bell Telephone Co. of Augusta; Henry Wright. associate editor. *Augusta Herald;* Col. Henry J. Hort. chapter president; Lt. Colonels Thomas K. Trigg. Edward W. Butzke and Marcus W. Heskett. and Majors Walter J. Hewitt and Norman J. Kinley. all of Camp Gordon.

After luncheon Colonel Dixon gave an informal talk and then led a round-table discussion on chapter problems. All present had an opportunity to comment or ask questions. Interest revolved mostly around the type of programs on which meetings could be built. Colonel Dixon stated that he had inquired of fifteen separate corporations as to whether they would be willing to sponsor lectures or demonstrations to chapters and had been gratified to receive twelve replies indicating interest in the idea. He believes that once chapters are aware of this and dates can be coordinated so that tours could be efficiently made. all concerned can look forward to an interesting series of programs.

Chapter President Hort requested that Colonel Dixon make arrangements to secure speakers for the chapter's September and November meetings and that a technical movie on communications manufacturing processes be made available for October.

Those at the meeting were pleasantly surprised when officials of Southern Bell "picked up the check." The gesture was appreciated by all concerned.

Chapter of the Year, 1950

AUGUST-CAMP GORDON

President—Henry J. Hort
Past Pres.—Hugh Fleming
Secretary—P. K. Jones

1951 Contest
Chapter of the Year

At the close of the first three months of the new contest the leading chapters were:

Sacramento
Pittsburgh
Philadelphia
San Francisco
Boston
Seattle
Chicago
Cleveland
Washington
Augusta—Camp Gordon

The resumption of chapter activities in the fall will undoubtedly effect some changes in the above list. Rules of the contest may be found on page 37 of the May-June issue of SIGNAL.

Boston

Members and guests of the recently reactivated Boston Chapter met at the Charlestown Navy Yard on June 22nd to hear Captain A. R. Taylor, USN, supervising inspector of Naval materiel. diseuss some of the phases of industrial mobilization planning.

Paul Hannah, general counsel of the Raytheon Company and vice-president of the chapter, presided in the absence of Rear Admiral T. F. Halloran, chapter president.

Baltimore

The 1950-51 executive committee of the chapter held its first meeting on July 13th in the offices of the Bendix

Radio Division. Present were: Wilbur L. Webb, president; E. K. Jett, past president; Walter Evans, past president; Capt. Richard E. Elliott, USN, vice-president; Col. Henry W. Williams, vice-president; George C. Ruehl, Jr., secretary; E. K. Foster, chairman of student activities; Donald C. Lee, program committee chairman; and Clinton H. Johnson, publicity committee chairman.

The program for the ensuing year was discussed and numerous ideas were proposed and noted by the program chairman. It was decided that the first meeting of the new year be held in late September at a downtown hotel in Baltimore and that it be a social affair enabling the new officers and members to become acquainted.

The possiblities of organizing student chapters were considered and E. K. Foster, general manager of Bendix Radio, was appointed chairman of a committee to develop this phase of chapter activity.

Group membership was the last item on the agenda. Several potential group members were advanced and it was decided that President Webb would visit national headquarters and discuss the matter further with Colonel George Dixon, AFCA Executive Secretary.

Chicago

Chicago's annual election was unique in that all its officers were re-elected for another year. Oliver Read continues as president; Ralph T. Brengle, Dwight Brown, John R. Howland, and James Kellogg as vice-presidents; and Raymond K. Fried as secretary-treasurer. Under the leadership of these same officers during the past year, the chapter rose from a completely inactive status to become one of AFCA's best.

The annual dinner-meeting was held on June 9th at the officers' club of the Naval Reserve Armory. A report on the recent annual AFCA convention was submitted to the members and plans were made for the chapter program for the coming year.

Cleveland

The Board of Directors of the Cleveland chapter met on June 21st in the Union Commerce Building to elect officers and make plans for the coming year. The directors are: L. J. Shaffer, Ohio Bell Telephone Company; V. G. Krebs, National Advisory Committee for Aeronautics; W. McClusky, Citizens Telephone Company; T. F. Peterson, American Steel & Wire Company; G. F. Prideaux, General Electric Company; C. H. Endress, Willard Storage Battery Company; L. K. Wildberg, Radiart Corporation; T. R. Beatty, National Carbon Company; and L. A. King, The Rola Company, Inc.

The following slate of officers was unanimously elected: L. J. Shaffer re-elected president; V. G. Krebs, 1st vice-president; W. McClusky, 2nd vice-president; T. F. Peterson, secretary; G. F. Prideaux, treasurer; C. H. Endress, member, executive committee.

President Shaffer reported on the national council meeting and the chapter presidents' conference both of which he attended at the AFCA annual convention in May.

Col. M. Mauer (standing, right), president of the Sacramento Chapter, is presented a certificate of merit from AFCA National Headquarters, by W. E. Thomas, Jr. Seated, L to R: Major Godfrey, Robert McCurry, and Col. Harry E. Vitzthum.

Detroit

Elwyn C. Balch, chief engineer of the Michigan Bell Telephone Company, was elected president of the Greater Detroit chapter at its 1950 annual business meeting on June 13th in the New Veterans Memorial Building. Other officers elected were: 1st vice-president — George H. Goldstone, attorney, re-elected for a second term; 2nd vice-president—Charles E. Quick, Detroit Edison Company, reelected for a second term; 3rd vice-president—Lt. Col. Peter D. Green, director of communications, 10th Air Force; secretary — Leo J. Ritter, New York Central Railroad Company; assistant secretary — D. J. Basolo, Michigan Bell Telephone Co.; treasurer — W. Clare Edwards, Michigan Bell Telephone Co.; assistant treasurer—James V. Grann, Jam Handy Corporation.

The chapter constitution and by-laws, previously approved by national headquarters, were formerly adopted by the membership.

The other business of the meeting was devoted to the problem of securing greater attendance at chapter meetings and the question of obtaining additional members. A committee was also appointed to look into the matter of having the chapter make awards to outstanding students in ROTC communications units at various universities and colleges in the Greater Detroit area.

Far East

The newly formed Eta Jima Post of the Far East Chapter held its first informal meeting recently when ten members journeyed to Hiroshima via "J" boat and toured the numerous "A" bomb damaged sites there.

Lt. Col. Charles W. Gibbs, director of the Signal Corps school division of the Eta Jima school command and inaugurator of the local membership drive for the new AFCA post, planned the trip to Hiroshima and made arrangements for the tour.

This was the first informal meeting of the new post which is now being organized after signing 15 new members during the local membership drive. A meeting for the election of officers is planned as soon as the post receives word on its charter application which was forwarded to the Far East Chapter in Tokyo.

Future plans of the post call for a meeting with representatives of the Hiroshima Telephone Company to discuss the effects of the "A" bomb on communication installations and a tour of the Hiroshima Central Telephone Office.

Although present membership of the new post is only 19, Pfc Jack McCune, campaign manager for the local membership drive, said that he anticipates a total membership of approximately 40 members.

Present members of the Eta Jima AFCA Post are: Lt. Col. C. W. Gibbs, Capt. T. H. Martin, Capt. S. A. Urbanski, Capt. R. O. White, Capt. E. H. Riggleman, Lt. Harry Karch, Lt. F. D. Secan, WOJG Frederick Doll, WOJG J. C. Sikorski, M/Sgt K. K. Kennedy, MS/Sgt Harrison Ensminger, M/Sgt R. R. Balestrieri, M/Sgt H. L. Hall, Sgt. C. E. Lissow, Sgt. W. B. Lesner, Cpl. Theodore Gadek, Mr. Warren Hom, Mr. Otto Dworsky and Miss Katusha W. Bradford.

Fort Monmouth

At a meeting of the chapter's Board of Directors on July 18th, committee chairmen were appointed as follows: membership — Capt. David M. Uhler; meetings—W. L. Seibert; industrial relations — Arthur F. Daniels; reserve affairs—W. F. Atwell; public relations —Lt. Col. B. Abramowitz; financial—Maj. James McClung; memorial—Maj. H. E. Maxwell; group membership—Lt. Col. Robert Haffa.

Capt. David Uhler and Col. E. A Kenny were elected to fill two vacancies

in the Board of Directors until the annual election in November. Lieut. Stanley B. Upchurch was appointed treasurer to succeed Miss Florence Adair who had resigned.

The financial report of the AFCA convention was presented to the Board and was approved. After considerable discussion, it was decided that the chapter would suspend meetings during August and September and would make plans for an enthusiastic meeting in October, to be supported by a good speaker, entertainment and food, at chapter expense.

Philadelphia

Philadelphia Chapter members turned out en masse for an informal dinner dance on June 10th in honor of their president, Wally Watts of RCA Victor Division. During the evening, Col. R. R. Rinkenbach, chairman of the program committee, presented Col. Watts with a hand carved shield bearing the AFCA emblem and the words "Colonel W. W. Watts, Organizer, First President, Philadelphia Chapter, 1947-1950." Mrs. Watts was honored with an orchid corsage and two dozen red roses.

The gathering took place at the officers' club of the Philadelphia Quartermaster Depot and was attended by some 400 members and guests. (*Other chapters take note: Philadelphia, with a membership of about 160, usually draws an attendance of twice that number at its meetings!*)

Pittsburgh

Elected president at the Pittsburgh Chapter's annual meeting on June 13th, Fred Moran, Superintendent of Western Union, now bears the distinction of having been chosen president by two AFCA chapters. He served as president of the Baltimore Chapter from June 1948-1949, was re-elected in June 1949 but was transferred to Pittsburgh the following month where he continued his active interest in AFCA affairs.

The annual banquet at the Hotel William Penn had a record attendance. Colonel George P. Dixon, AFCA Executive Secretary, spoke, stressing "Communications are absolutely essential and extremely important to the armed forces because they constitute the nerve centers of military activities throughout the world in times of peace and war." He emphasized the importance of close cooperation between the armed forces and the communications industry in order to be prepared for any emergency. The second part of Colonel Dixon's talk concerned his experiences with communications operations and industry in South America, where he recently spent nearly two years as regional vice-president for the I.T.&T. Corp. with headquarters in Rio de Janeiro.

The evening's entertainment wound up with some very well performed tricks of magic by one of the chapter members.

Other officers elected for the ensuing year are: 1st vice-president — S. C. Stoehr, Jr., Bell Telephone Company; 2nd vice-president—R. E. Stark, Stupakoff Ceramic & Manufacturing Co.; treasurer—Charles A. McKenney, Jr., Peoples First National Bank & Trust Co.; secretary—Andrew N. Galone, Bell Telephone Company.

Sacramento

The Sacramento Signal Depot was host to the Sacramento Chapter for its May 25th meeting. Col. Harry L. Vitzthum, commanding officer, welcomed the members and guests and congratulated the chapter on its achievements during the year. Mr. W. E. Thomas presented Chapter President Milt Mauer, of the Pacific Tel & Tel Co., with the scroll awarded the chapter at the annual AFCA convention for second place in the "Chapter of the Year" contest.

The subject of the evening, commercial photography, was presented by Robert O. McCurry of the McCurry Photo Company and was accompanied by demonstrations of the Polaroid Camera and Stereo-pictures.

Results of the recent annual election were announced and the following officers were installed: president—M.G. Mauer, re-elected for a second term; vice-presidents—C. A. Bairos, James R. Miller, Robert D. Livingston, Paul E. Shaad; executive secretary — C. A. House, also re-elected for a second term; Board of Directors: H. M. Skidmore, Waldemar Doyal, Paul Carrington, Art Tanner, L. J. Brundige and W. F. Falck.

Paul Larsen of National Security Resources Board speaking at Washington Chapter meeting.

San Francisco

Joint meetings with local units of other associations comprised the chapter's activities during the month of May.

On May 22nd, AFCA members met with the IRE in sponsoring a color television symposium in the auditorium of the Mission High School, San Francisco. Mr. R. A. Isberg of Station KRON-TV, chairman of the AFCA publicity committee and program chairman of the IRE, introduced the speakers.

On May 25th, the chapter joined with the AIEE and the IRE in featuring a talk by Dr. Ralph Bown of the Bell Telephone Laboratories on "Modern Methods of Electrical Communications." The meeting was held in the Pacific Tel & Tel auditorium and was opened by Lt. Col. George J. LeBlanc, AFCA chapter vice-president and Pacific Tel & Tel engineer.

Col. Lloyd C. Parsons, Signal Officer, Sixth Army, addressed the July 27th meeting of the chapter on the current situation in Korea. Formerly stationed with the U. S. Forces in Korea, Colonel Parsons was well qualified to present this subject. He conducted a discussion period at the conclusion of his talk and answered numerous questions.

A Signal Corps film, entitled "Communism," was then shown. This film had just been released and Colonel Parsons stated it was the intent of the armed forces that it be shown to all members of the services.

Seattle

"Invisible Ramparts," an Army film depicting the history of the Alaska Communication System, was featured on the program of the June 14th meeting of the Seattle Chapter in the Chamber of Commerce Building. The film

John R. Henry, southeastern manager of the International News Service, speaking at Augusta-Camp Gordon meeting. Seated, L to R: Col. Robert A. Willard, Col. Henry J. Hort (chapter president), Louis Harris, and Hugh Fleming.

commemorates the 50th anniversary of the establishment of the ACS by the Signal Corps on May 26, 1900, and gives a comprehensive picture of the operation of the communication system throughout Alaska.

Mr. Hershal Wandling, Jr., of the Radio Products Co., discussed the latest developments of the Webster recording equipment and demonstrated the wire and tape models. He pointed out that the recording machine industry began to develop during the last war until now it is doing a $25,000,000 annual bsiness, with machines commonly in use by doctors, broadcasting stations, the armed services, courts, schools, etc.

Washington

In its final meeting, July 6th, for the fiscal year 1950, the Washington Chapter elected officers and directors for the coming year, and heard an address by Director Paul J. Larsen of the Office of Civilian Mobilization, National Security Resources Board. The address and the business meeting followed cocktails and a buffet supper which for its excellence brought unanimous compliments from the 150 members and guests present.

Mr. Larsen, former director of the Sandia (New Mexico) laboratory for the Atomic Energy Commission, spoke on "civilian defense." Highly interesting in its appropriateness to the nation's current preparations against attack, the address was given added interest in the period following when Mr. Larsen answered questions from the floor concerning the subject matter of his talk.

In the election of officers and directors of the chapter, Francis H. Engel, Washington manager of the RCA Victor Division, was reelected as president to serve for another year. Vice-presidents elected were J. R. B. Crigler, vice president and general manager of the Chesapeake and Potomac Telephone Co.; Major General Kirke B. Lawton, Deputy Chief Signal Officer; Rear Admiral John R. Redman, Director of Naval Communications; and Brigadier General Wallace G. Smith, commanding general of the Air & Airways Communications Service.

Directors named for the coming year were Colonel James W. Baldwin, Assistant Deputy Chief Signal Officer; Captain William Beltz, USN, Assistant Director for Electronics of the Navy Bureau of Ships; Colonel Percy Black, vice president of Gary Services; Colonel Eugene V. Elder, assistant chief of the procurement & distribution division of the Office of the Chief Signal Officer; E. J. Girard, Washington representative of Federal Telephone & Radio Corp.; Fred P. Guthrie, assistant vice president of RCA Communications; G. C. Harris, Western Union Superintendent in Washington; Captain C. F. Horne, assistant director of the Office of Federal Airways; A. L. Milk, Washington manager of Sylvania Electric Products, Inc.; S. A. Moss, general plant manager of the C & P Telephone Co.; Commander Guy M. Neely, Chief engineer of the Office of the Director of Naval Communications; Major R. H. Ralls, USAF, officer-in-charge of the military amateur network; C. H. Teskey, division attorney of the American Telephone and Telegraph Co., long lines department; D. C. Trafton, of the USAF Directorate of Communications; and Commodore E. M. Webster, wartime Director of Coast Guard Communications, and presently an FCC Commissioner and a national director of the AFCA.

Enjoying the buffet at Washington Chapter meeting are, L to R: Jules A. Renhardt, William Hardman, Capt. Hedley Morris, USN, John Stewart, Sidney K. Wolf, and Capt. Chris Engleman, USN.

Captain Donald E. McKay, until recently Chief of Comunications of the Coast Guard, was also elected a director of the Chapter, but his more recent change of assignment will likely remove him from the Washington area for some time. *(See Coast Guard department in the News section).*

Edward C. Cover of the C & P Telephone Co. was again elected as secretary-treasurer of the chapter, a post he has held for several years. Lt. Colonel J. A. Pernice of the Office of the Chief Signal Officer was named general counsel.

Colonel Cover has been mainly responsible for luncheon and dinner arrangements for all chapter meetings during his tenure of office, and the consistent excellence of the arrangements has brought the chapter membership to depend on Ed Cover to come through with something out of the ordinary. In the latest meeting it was enthusiastically agreed that the cocktail and buffet supper surpassed any provided before, good as they were.

(The 80th Signal Depot Headquarters Company, an affiliated unit sponsored by the C & P Telephone Company and commanded by Colonel Cover, had been alerted for active duty as SIGNAL *went to press with this issue.)*

Mr. Larsen's address to the chapter was made the evening before a conference of civil defense and NSRB officials with representatives of all segments of the communications industry. The meeting was one of a series which Mr. Larsen's office is conducting with representatives of key industries and services and state and municipal officials in laying the groundwork for its civil defense guide to states and municipalities expected to be transmitted to state and city officials in September.

The AFCA, Mr. Larsen stated, can be of considerable help in civil defense preparations. The federal government, he explained, can be responsible only for air raid alert warnings and the communications to tie together state agencies and the regional offices of the civil defense organizations. Each community must solve its intrastate communications problems, he declared, and the AFCA can aid by giving to state and municipal agencies guidance and recommendations in implementing or tying together existing communications systems.

STUDENT CHAPTERS

In this issue Student Chapters are listed in Association Affairs, beginning page 29, detailing ROTC winners of AFCA Medal.

NEWS—SERVICES and INDUSTRY

GENERAL

Communications-Electronics Lead in War Accomplishment

While the fighting in Korea continued savagely, with the tide of communist invasion yet unturned, in the U.S. the mobilization of military supply sources was being led in planning and accomplishments by the electronics-communications field, both industrial and military.

All military communications have made progress in the war effort, and procurement and operational planning by the commercial services and manufacturers have been stepped up to a fast pace to meet requirements of the armed services.

That electronics-communications industries are in the forefront of national defense preparedness was illustrated by the recent session of outstanding executives as an advisory group to the Signal Corps on procurement matters in order to insure rapid delivery of vital equipment to the combat forces overseas and to the growing forces at home.

The Air Force communications personnel in Korea and the Far East have been conducting their vital operations in support of bombing operations with heroic efforts and extremely long hours of operation, with little or no time for rest, according to the Air Forces director of communications, Major General F. L. Ankenbrandt, who returned recently from a 12-day survey in the Far East. General Ankenbrandt stated that he is most gratified with the manner in which the Air Force communications personnel and the AACS units have responded to the sudden very heavy loads placed upon them since the aggression by the North Korean communists began.

Naval communications has also experienced a very marked increase in its traffic loads. There has been a rise of 100% in the traffic with the Far East and Pacific areas, and an estimated overall increase of 50% in the total communications service traffic. Rear Admiral John R. Redman, Director of Naval Communications, has expressed high praise for the Naval communications personnel for their efficient performance in the face of the stepped-up workload.

One phase of the electronic-communications procurement program bulking in large volume will be the supplying of equipment in this field for the large number of airplanes ordered by the Air Force and soon to be contracted for by the Navy. It is estimated that of the over $5 billion in orders by these services, electronics-communications equipment will entail an expenditure of 10 to 15% of the total.

Harrison to Head Materials Controls for Commerce Dept.

The most important task in the new domestic mobilization controls program—the priorities, allocations, and inventory controls of scarce materials, such as steel, copper, and tin—is to be assigned under the leadership of Major General William H. Harrison, president of the International Telephone & Telegraph Corporation, who will bring to the assignment the exceptional background of his work in World War II with the two predecessor agencies of the War Production Board, and as director of the $7 billion procurement program of the Signal Corps.

The new post—administrator of the new defense production administration in the Department of Commerce—would put General Harrison in charge of the most important responsibilities under the proposed domestic economic mobilization and controls legislation. He will have a rank comparable to that of undersecretary and he will report directly to the secretary. ***(AFCA 1950 convention visitors will recall General Harrison as the principal speaker of that meeting.)***

Controls Outlook

It has been widely reported in Washington that certain Presidential advisers feel that civilian production restrictions and priorities should be put into effect, but the decision, of course, rests on the military situation in Korea, whether the U., S. "police" commitments are extended, and whether the nation's high command decides that the threats facing the nation justify all-out mobilization for defense.

Little prospect of "mobilization" of the communications-electronics industry, in terms of required conversion to military orders and institution of a full-scale priority system, is seen by government mobilization planners on the basis of the present Korean situation. They explain that the industry now has about $500 million in military orders, and that $1 or $2 billion of total procurement for the services to meet needs in connection with the Korean police action, of which perhaps 10-20% would be communications and electronics items, would not add greatly, in terms of proportion, to current production schedules.

Should the National Security Resources Board be faced with a tremendous demand from the military services for communications and electronics equipment, however, it is obvious that restrictions and controls would be imposed. This could occur with or without a more serious threat of all-out war, should the government decide to accelerate further the defense program and stockpile equipment, or should it require additional apparatus for expanded activities of the armed services.

First step in the institution of controls probably would be to accelerate delivery of military items by putting some priority system into effect for deliveries. As matters now stand, it was pointed out, contracts have been let on a competitive bidding basis and, while manufacturers have been prompt in making deliveries, there has been no demand for preferential treatment of production for the armed services. If a priority system goes into effect, it will doubtless be extended down the line to cover components. Heavy orders for "M-Day" preparation, of course, would mean sweeping federal controls all along the line, including manpower, installment credit to consumers, and raw materials. Legislative authority might be required for extensive shifting of the nation into a war economy.

Under the current setup, the Munitions Board processes military requirements, while the NSRB would be the agency to impose civilian controls.

Preliminary plans for the gearing of industrial manufacturers into highspeed production should industrial mobilization become necessary were discussed last week at conferences between top procurement officers of the Army and Navy, officials of the NSRB and Munitions Board, and civilian manufacturing officials, during which Radio-Television Manufacturers Association President Robert C. Sprague stated that manufacturers of electronic components and equipment will do whatever is necessary to meet urgent requirements of the military services for electronic items.

Immediate military needs for electronic equipment and components have not yet been disclosed, but informal estimates indicate that requirements for the Korean situation can be met by industry without serious cutbacks in radio-television civilian production, President Sprague said. Overall requirements for Korea are not expected to exceed 20% of the industry's output and may be only 10% to 15%, he added, pointing out however, that the situation can become aggravated quickly, and in event of an all-out mobiliza-

THIS DEPARTMENT'S PRINCIPAL SOURCE

Telecommunications Reports

Roland C. Davies, Editor
National Press Building
Washington, D. C.

tion, the entire resources of the industry will be required for military purposes.

However, little possibility was seen of any early restrictive orders being issued affecting the communications field, with regard to either facilities or equipment production, but it was pointed out in one responsible quarter that the situation could change "any minute."

The NSRB through the past year has revised its plans to meet future possibilities in the communication field and all critical areas of the nation's economy. This advance planning has been coordinated with industry advisory committees from the telephone and telegraph broadcasting industries on any necessities which might arise for establishing priorities of service and use of strategic materials.

Expanded military needs for communications-electronics equipment are in prospect in connection with the discussions now going on between military spokesmen and aircraft companies concerning expedited production of aircraft for the armed services. Extensive communications and electronics installations are needed in connection with aircraft construction and operation. The aircraft discussions are said to center on accelerating deliveries on contracts let before the Korean crisis.

For the nation's communications and operating companies, the increasing indications of further calls for the armed services, and the expanded production requirements of the armed services, will mean a gradually tightening manpower situation. Although it is unlikely that the draft of men 19-26 will have any material effect on the operating companies, the possibility that affiliated reserve units will be called up along with other reserves will mean departure of some qualified men from the operating companies. A serious matter for the manufacturing companies, if defense procurement is materially expanded, is the comparatively small number of unemployed at present. Obviously, the labor market will tighten up far sooner than it did during the pre-World War II preparedness period.

Sig. Corps, Navy Bid Awards

By far the largest contract awarded in Signal Corps procurement action over $100,000 reported during the week of July 3-7 went to the Utility Electronics Corp., Newark, N. J., for radio sets totaling an expenditure of more than $3 million. A total of 17 contracts to private concerns exceeded $9 million.

Awards to manufacturers for equipment to be used in communications and electronics operations included agreements with North Electric Mfg. Co., Galion, O., for switchboard apparatus, $359,751; Espey Mfg. Co., New York, N. Y., radio transmitters, $142,312; National Carbon Division of the Union Carbide & Carbon Corp., New York, batteries, $372,230; Utility Electronics Corp., Newark, radio sets, $3,120,559; the Hallicrafters Co., Chicago, Ill., radio terminal sets, $305,234; Maspeth Telephone and Radio Corp., Brooklyn, N. Y., teletypewriters and sub-items, $424,311; Collins Radio Co., Cedar Rapids, Iowa, receiving equipment, $810,155; and Consolidated Diesel Electric Corp., Mt. Vernon, N. Y., power units, $1,203,402.

Other contracts for similar apparatus went to Western Electric Co., teletypewriters, $408,675; George Vernon Co., Philadelphia, Pa., maintenance equipment, $187,180; Bolinders Co., Inc., New York, power units, $847,884; Hubbell & Miller Co., New York, radio sets, $241,475; Tracerlab, Inc., Boston, Mass., radiac training sets, $323,330; and the Kelley-Koett Mfg. Co., Covington, Ky., radiacmeters, pocket chambers, and radiac detector chargers, $170,904.

The Teletype Corp. and the General Electric Co. received the largest contracts for communications and electronics equipment in a Navy Department procurement listing of awards to private concerns of $50,000 or more, totaling expenditures of more than $4.5 million, announced last week. The Teletype contract was for approximately $1 million in terminal equipment, and the G. E. award was for approximately $900,000 in 25 antenna arrays.

Other Navy contracts went to Federal Telephone & Radio Corp., for supplying 68 radio receivers and for testing 10 new type electron tubes, $250,000; Bendix Aviation Corp., 11 direction finders, $50,000, General Communica-

Unified Communications Speeds Expansion

McClelland Program Paying Off

The cross-servicing program initiated under the direction of Maj. Gen. H. M. McClelland, director of communication-electronics for the joint chiefs of staff, has meant that the armed forces have been able to meet the sharply increased communication requirements of the Korean war situation much more rapidly than would have been possible in any other manner.

Under the cross-servicing plan, each service has communications equipment on a stand-by basis, and is able to turn it over to another branch of the Department of Defense for operation when a need arises. As an example, the Army might have equipment for a formerly-operated circuit, now shut down, available on stand-by, and would promptly make it available to the Navy or Air Force if one of the latter services had communications requirements it could not fill with its own operating equipment.

When General McClelland assumed his present post, it was pointed out, he began a program of eliminating duplicate or parallel communications links operated by the armed services. Equipment for those links was kept on a stand-by basis. Then, when the Korean crisis arose, the facilities were ready to operate in keeping abreast of the mounting flow of armed services' communications.

It was explained that, while detailed discussion of the value of unification would involve examples of specific circuits—considered classified information—the general effect of the unification program has been of great advantage.

Unification was not new to the armed services' communicators, of course. It was begun prior to World War II, and stepped up rapidly during that conflict on an agreement basis, but without the overall supervision of a representative of the joint chiefs of staff assigned to communication-electronic duties. The gap was filled, of course, after the unification act, with the appointment of General McClelland.

Naval aviation also provided a picture of communications unification which was described in a July 28 communique from General MacArthur's headquarters. On Wednesday, July 26, the communique stated, a triple play setup was organized with the targets being picked up by the Army ground forces in the front lines and relayed, to Air Force spotting planes, and by the latter to the naval carrier-based fighters and bombers. (Incidentally, *New York Herald Tribune* Aviation Editor, Gill Robb Wilson, July 25, pointed out that, while Russia is ahead in tactical air power, the Soviet air force is "still in the woods" in the use of electronics.)

While security prevented absolutely any disclosures of the Signal Corps performances and supplying of communications-electronics equipment to the valiantly fighting GI's in Korea, there was no question but that the Signal Corps has achieved its usual accomplishment of providing adequate field and divisional communications facilities and personnel, just as in World War II, when the Signal Corps was outstanding among the technical services of the Army in providing equipment and components for the combat troops.

It will be recalled that attestation of the accomplishments of the Signal Corps was given by General Omar Bradley, when he left the post of Army Chief of Staff to become Chairman of the Joint Chiefs of Staff, in a letter to General Akin that read "as you know, I am always bragging about the efficiency of the Signal Corps during the last war." Lauding in his letter the "ability and judgment" of General Akin, the Joint Chiefs of Staff Chairman wrote "I hope that they (the Signal Corps) will continue to serve you and the Army in the same high degree of efficiency that they have always displayed."

Since the telephone was "a toy"...

BACK IN 1881, when this curious old switchboard was in use, many people thought of the telephone as little more than a toy. Apparatus was crude and service was limited—but even then the telephone was proving its worth.

Ever since those pioneer days, Western Electric has had a leading part in the industry, as a maker of good telephone equipment—the kind that helps make good telephone service possible.

Western Electric

TELEPHONE APPARATUS AND CABLE

tions Co., Boston, Mass., 87 radar test sets, $200,000; Electronic Measurements Co., Red Bank, N. J., 58 radio transmitting sets, $681,166; Simpson Electric Co., Chicago, Ill., 624 portable electronic multimeters, $60,166 Espey Mfg. C., New York, electronic test sets, $656,115; Clough Brengle Co., Chicago, Ill., test equipment, $50,000; Weston Electrical Instrument Corp., Newark, N. J., 1200 multimeters, $50,000; Hycon Mfg. Co., Pasadena, Calif., 1966 oscilloscopes, $269,606; Federal Mfg. & Eng. Corp., Brooklyn, N. Y., 216 signal generators, $215,412; and Technicraft Corp., Kansas City, Mo., 354 signal generators, $355,094.

Chiefs Visit Activities

The two leaders of the Air Force and Army communications were back at their offices in the Pentagon at the end of July after observing activities of their respective services.

Maj. Gen. Francis L. Ankenbrandt, Director of Air Force Communications, returned July 26 after a nearly two-week intensive survey of the Air Force communications operations in the Korean theater and the Far East.

The Chief Signal Officer, Maj. Gen. S. B. Akin, returned July 30, after a short, intensive inspection of Signal Corps installations and procurement activities in this country. General Akin with his service as Chief Signal Officer to General MacArthur during the entire Pacific fighting from Corregidor to the occupation of Japan, has a most comprehensive knowledge of the Far Easten theater and the conditions in the Korean combat zone.

The Air Force communications and electronic navigation and traffic controls have paid off real dividends in Korea, it is known and can be learned from snatches of information on developments in that combat area. For example, the Fifth Air Force has a number of fighter control jeeps assigned to front line units of the Army and these, working with slow-flying liaison observation planes, designate the targets on the ground through very high frequency radio contacts with the jet planes. This is an adaptation of the tactics used in World War II with lead tanks directing planes in ground-support missions.

Stockpile Should Hit 57% Munitions Board Reports

The nation's stockpile of critical materials now stands at about 38.4% of the goal, and should be increased to 57% by the end of the current fiscal year, it was reported by the Munitions Board Tuesday, July 25. Materials on hand and on order now amount to about 50% of the goal, it was said, and appropriations now pending before Congress would raise the total to 57%.

In line with earlier reports that the stockpiles are spotty, with some materials having reached the required totals and others well below the target figures, the Munitions Board said that buying of five materials—agar, chromite (refractory grade), mercury, tantalite, and vanadium—has been suspended, but that procurement of other items lagged behind previously established rates, during the past fiscal year. In particular, it was noted, stockpile schedules were not met in rubber, copper, and zinc, and negotiations for tin purchases were not concluded until late in the fiscal year. Part of the difficulty, the report said, was difficulty of obtaining materials because of heightened industrial activity.

The Munitions Board said that a review of stockpile objectives has shown the estimated goal to be $4.05 billion, rather than the $3.4 billion estimate of a year ago and the $3.7 billion figure forecast at the outset of 1950. This is due, it was said, not only to rising prices, but also to a review of objectives in the light of the strategic situation and the nation's expected needs in time of emergency.

As part of the current defense preparedness program, however, legislation is expected to be sent to Capitol Hill by the administration to expand the present rate of stockpiling, add to the funds allocated for the current fiscal year, and raise the overall goals of the program.

In his report to Congress, Archibald S. Alexander, acting chairman of the Munitions Board, cited the materials conservation programs of the armed services. His report mentioned that the Navy is replacing natural mica with synthetic mica and "both the Army and Navy are developing miniaturization programs in communications, radar and other electronic devices to reduce requirements by scaling down the size of the equipment itself."

FCC Committee Meets With Service Communicators

A three-member committee of FCC Commissioners—Chairman Wayne Coy and Commissioners E. M. Webster and George E. Sterling—held an informal conference with top-level officers of the three armed services concerned with communications Monday, July 24, to canvass the relationships and coordination of the FCC with national defense preparedness and in civil defense activities.

The representatives of the armed services were; Maj. Gen. H. M. McClelland, Director of Communications and Electronics of the Joint Chief of Staff; Rear Adm. John R. Redman, Chief of Naval Communications; Brig. Gen. Ivan Farman, Deputy Director of Air Force Communications; and Brig. Gen. Wesley Guest, Chief of the Plans and Operations Division of the Signal Corps, who represented Maj. Gen. S. B. Akin, Chief Signal Officer.

There is no thought at the present time, it is believed, of receiving a counterpart of the pre-World War II De-

Captain Ray W. Graham, USN, retired in June after a 30 year naval career, mostly in communications. See page 52, col. 2.

fense Communications Board which was pushed into the national defense preparedness picture at that time by former FCC Chairman James Lawrence Fly. Of course, if the world situation should become much worse, there would arise, in all probability, the necessity for the re-creation of an organization similar to the DCB or the Board of War Communications, so that the FCC functions, particularly frequency coordination, would be fully coordinated with the armed services and the other major departments.

The FCC Commissioners' committee will maintain a continuous survey of the situation and the problems in which the commission's activities will be connected with the national defense situation, it was cited by Chairman Coy. Problems will be delegated to staff groups for study and recommendations. One staff appointment for such work was Benito Gaguine, assistant to Commissioner Rosel H. Hyde, who was designated FCC liaison officer with the military establishment on broadcasting problems.

MB Advisory Committee Meets

The Electronic Industry Advisory Committee to the Munitions Board was scheduled to meet in the Munitions Board's conference rooms at the Pentagon on August 14, it was announced July 28 by Marvin Hobbs, Chief of the MB Communications-Electronics Division. Previously the session had been scheduled for Sept. 24, but was moved up because of the Korean and international situations.

The committee, composed of representatives from 29 leading radio-electronics end-equipment and component manufacturing companies, is headed by Frederick R. Lack, vice president of

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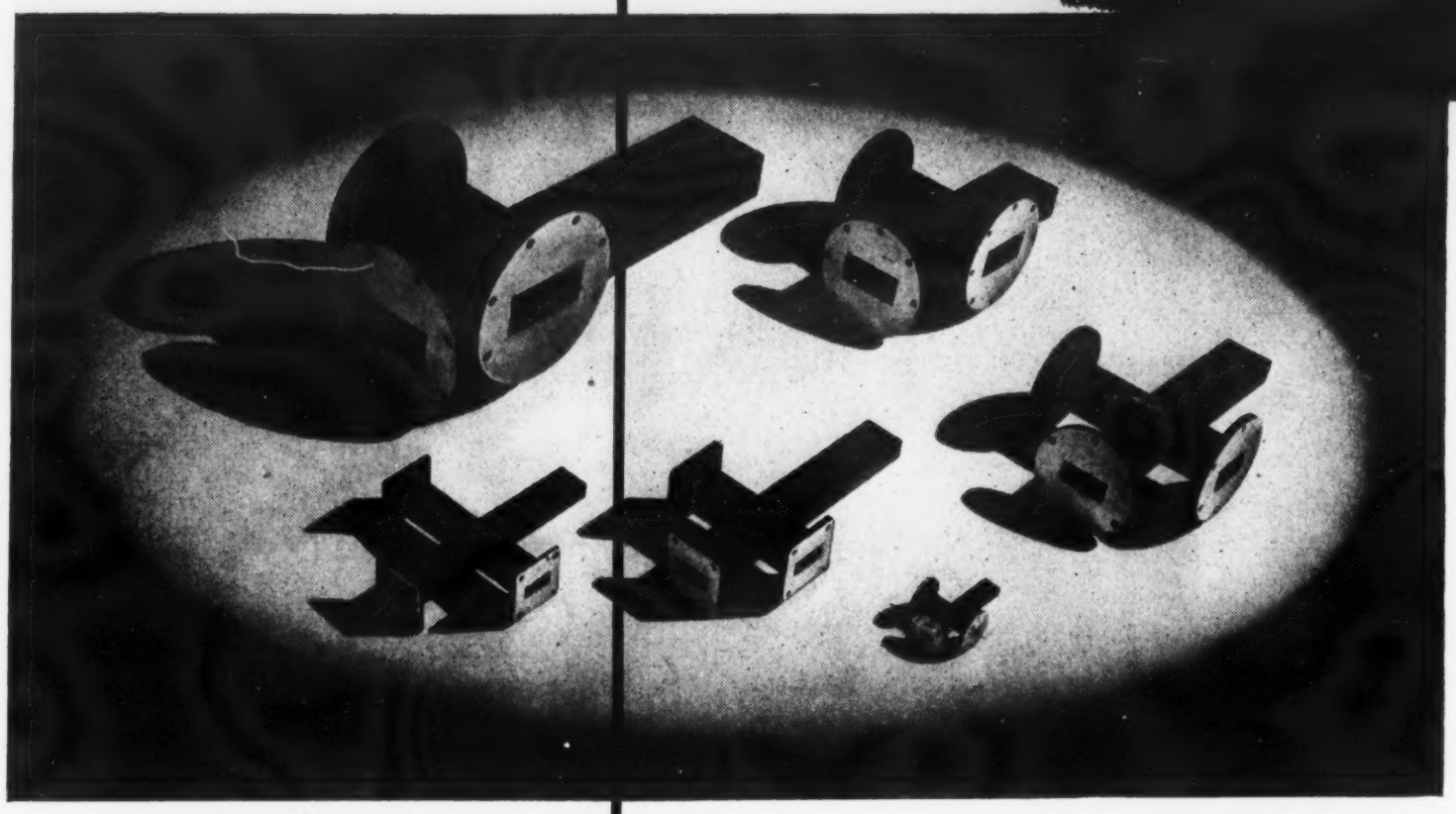

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■ The coupling varies less than 3 db over the entire useful frequency band of the waveguide transmission line, whereas other types of couplers have attenuation which varies rapidly with frequency. Calibration accuracy on these instruments is ±0.5 db through the quoted range. Operating temperature range is from −40° to +55° C and humidity effects are negligible.

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ELECTRICAL CHARACTERISTICS			LINE AND CONNECTOR TYPES		
			Waveguide		Connectors Both Arms
Model No.	Frequency Range (Kmc)	Nominal Coupling (Db)	AN Type	Size (in.-O.D.)	AN Type
306	2.6-4.0	30	RG-58/U	3x1½x.080	UG-214/U
233	4.0-6.0	24	RC-49/U	2x1x.064	UG-149A/U
321	4.0-6.0	30			
322	4.0-6.0	40			
209	5.3-8.1	24	RG-50/U	1½x¾x.064	UG-344/U
237	5.3-8.1	30			
235	8.1-12.4	20	RG-52/U	1x½x.050	UG-39/U
236	8.1-12.4	24			
234	8.1-12.4	40			
388	12.4-17.0	20	RG-91/U	.702x.391x.040	UG-419/U
413	18.0-26.5	20	RG-53/U	½x¼x.040	UG-425/U
415	18.0-26.5	40			
405	26.5-36.0	20	RG-96/U	.360x.220x.040	UG-381/U

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the Western Electric Co., and president last year of the AFCA. Among the members of the committee are Dr. W. R. G. Baker, vice president in charge of electronics of General Electric; Max F. Balcom, chairman of Sylvania; E. W. Butler, vice president of Federal Telephone & Radio Corp.; Ray C. Ellis, vice president of the Raytheon Manufacturing Co.; Walter Evans, vice president-radio of Westinghouse Electric Corp.; President Frank M. Folsom of the Radio Corporation of America; president Paul V. Galvin of Motorola Inc.; president W. J. Halligan of Hallicrafters Co.; vice president Robert F. Herr of Philco Corp.; vice president W. P. Hilliard of Bendix Radio Division; president W. A. MacDonald of Hazeltine Electronics Corp.; and president Robert C. Sprague of Sprague Electric Co., who is the 1950-51 president of the Radio-Television Manufacturers Association.

The RTMA president, Mr. Sprague, announced July 26 that the association would not set up at this time a separate association mobilization committee because it would merely duplicate the work of the Electronic Industry Advisory Committee. He stressed that the RTMA has been active in preparing a mobilization plan for the industry and has cooperated with the national defense officials "in expediting the procurement of radio and electronic parts and equipment for our armed forces." (Mr. Sprague is a graduate of the U. S. Naval Academy, so he has gone all-out for coordination with the armed services.)

Policy Board Reports

Key personnel with specific assignments in two of the major problems assigned to President Truman's Communications Policy Board—efficient frequency utilization and economic problems—were appointed by the board in its fourth meeting, held in Washington July 10-12. The next board meeting was scheduled for Aug. 2-3.

A highlight of the meeting was the committee's report to President Truman at the White House. The members, outlining broadly their progress to date and their plans for future study, were given President Truman's endorsement of their endeavors to date and their plans for further gathering of information and analysis of the sweeping and significant problems assigned to them.

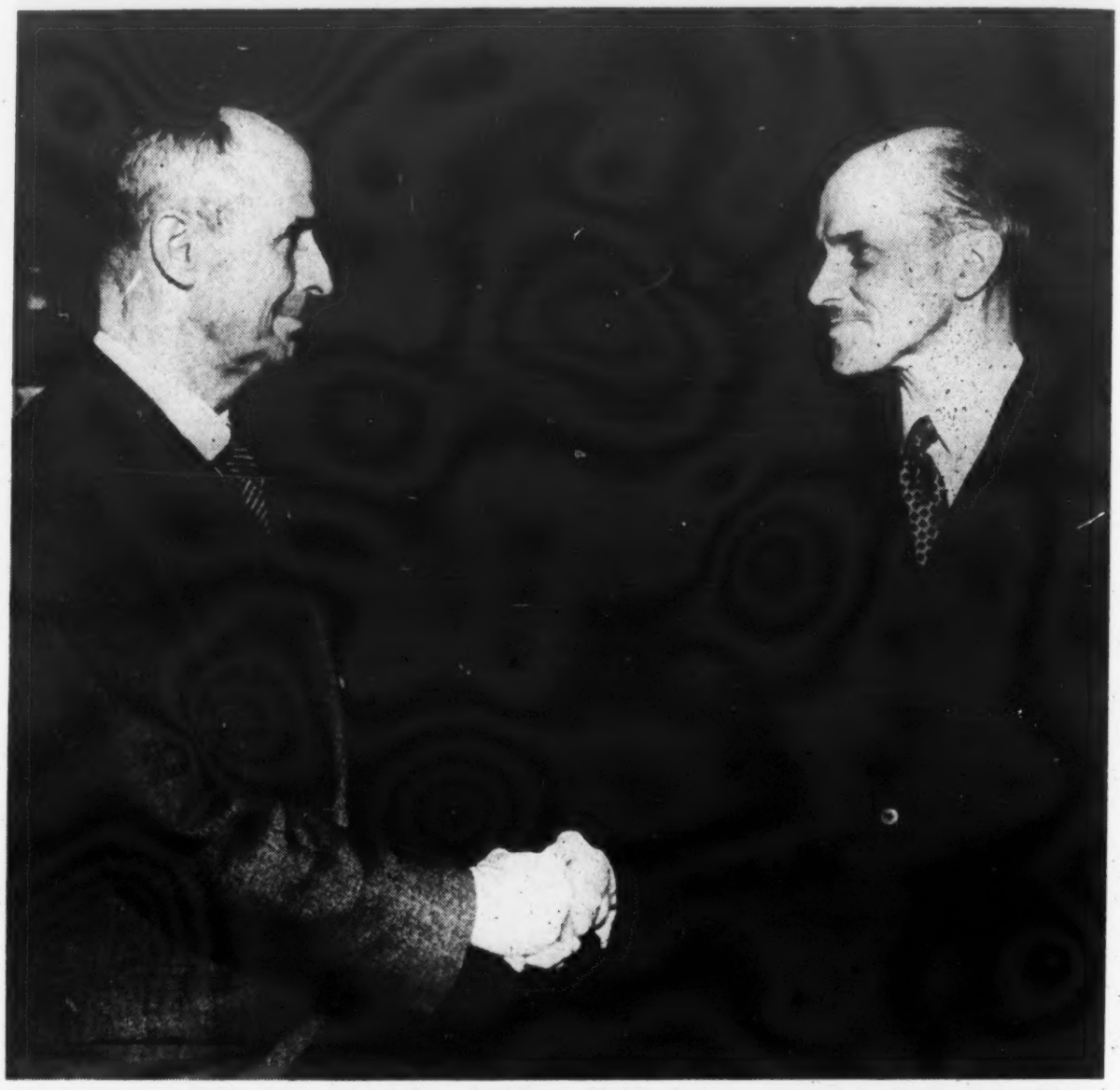
F. C. Alexander, until recently on the engineering staff of the American Cable & Radio Corp., was named to head the study of frequency utilization. Mr. Alexander has wide experience in the fields the board must study perhaps more closely than any others—international telegraph and military communications. He is a former Globe Wireless vice president who during the war was in Naval communications.

To study "certain economic aspects of the board's assignment"—obviously the parlous financial situation of most of the international telegraph companies and the complex financial considerations of any international merger will be among the major aspects—the board named Professor Marvin L. Fair of Tulane University. Mr. Fair, although he has specialized in the transportation field, was director of research of the Great Lakes survey conducted by the FCC in 1937-39 to survey development of record communications and safety services in that area.

With its broad field of problems and policies to survey, and the large amount of information which still must be gathered, it is understood that the group has not proceeded far enough to reach any policy decisions. The crowded calendars of each of the members and their wide geographical separation make it difficult to arrange meeting dates, and it is felt that under the circumstances substantial progress has been made. Completion of the board's multi-faceted report by Oct. 31 is felt in some circles to be virtually impossible, but it is understood that the board members still are hoping that the target date can be met.

Mr. Alexander, since World War II, has been on the staff of A. C. & R. vice president and chief engineer Haraden Pratt, chiefly on loan to the State Department for service at Rio, Atlantic City, and Moscow international communications conferences, and the Geneva sessions of the Provisional Frequency Board. He served in Naval communications during the war, and prior to that time, for eight years, was vice president of Globe Wireless in charge of New York, Washington, and Chicago operations. Before his Globe Wireless assignment he was in the Navy.

Professor Fair, an economist associated with the School of Commerce and Business Administration at Tulane, was on the staff of the Maritime Commission before joining the university. During the war, he served with the War Production Board, after earlier experience with the Bureau of Budget and as a faculty member at Temple and Ohio State University.



Major General S. B. Akin, Chief Signal Officer (left), being greeted in England by Major General W. A. Scott, C.B., C.B.E., Director of Signals, British War Office, on the occasion of General Akin's visit to the United Kingdom in May of this year. The CSO's visit returned one made in 1948 to the U.S. by the then Director of Signals, Major General C. H. H. Vulliamy, C.B., D.S.O. General Akin made the U.K. visit at the time of his tour of U.S. overseas signal installations last spring.

CAA Recommends 2-Way Radio For Private Planes

The requirement of two-way radio equipment for aircraft entering control zones of certain heavily-used airports was one of 14 recommendations of the CAA Airports Advisory Committee recently made to Civil Aeronautics Administrator Delos W. Rentzel. The recommendation applied to private aircraft. At the same time, the FCC made final July 21 its rules changes which were proposed last April 12 to make

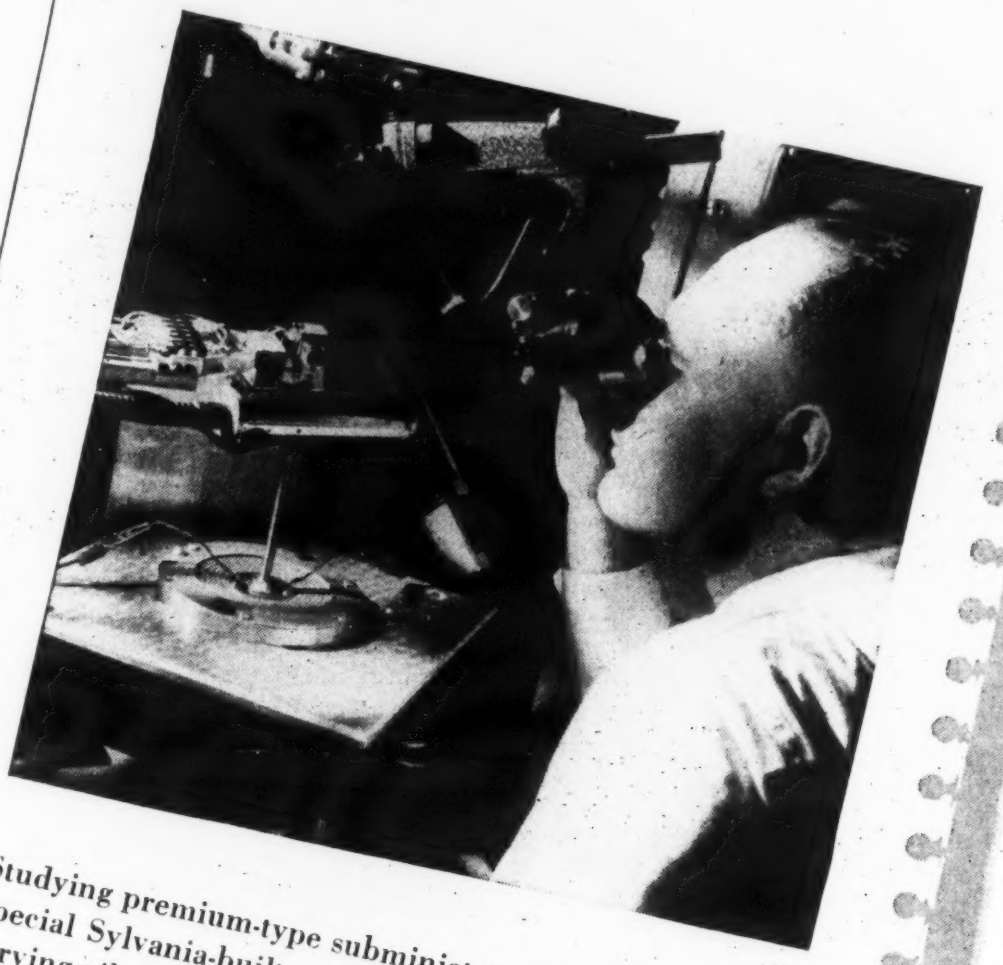
A page from the note-book of Sylvania Research

Shock and vibration studies back up the reliability of SYLVANIA Subminiature Tubes

Exhaustive, scientific studies of the electrical noise produced in subminiature tubes, as a result of shock and vibration, are carried on by Sylvania research engineers.

New methods and equipment have been developed to measure the electrical response of tubes to mechanical motion under precisely controlled conditions. For noise tests the tubes are vibrated with electromagnetic equipment at frequencies throughout the range of 25 to 10,000 cycles per second. The tube signals generated during these tests indicate the general characteristics of tube response to mechanical excitation and also the resonant frequencies of the tube elements.

Checks are made on a quality control sampling basis for 500-g impact, shock, and interelectrode capacitances. After completion of tests, each tube must conform to required specifications.



Studying premium-type subminiature tube behavior with special Sylvania-built equipment. Operator is shown observing vibration frequencies at which tube elements may become resonant.

SYLVANIA ELECTRIC

RADIO TUBES; TELEVISION PICTURE TUBES; ELECTRONIC PRODUCTS; ELECTRONIC TEST EQUIPMENT; FLUORESCENT LAMPS, FIXTURES, SIGN TUBING, WIRING DEVICES; LIGHT BULBS; PHOTOLAMPS, TELEVISION SETS

the 27.51 mc frequency specifically available for low power industrial radio installations aboard aircraft, and to except such installations from the requirement that the maximum distance between the transmitter and the radiating portion of the antenna not exceed three feet, effective Aug. 31.

Color TV Report Made

The most complete and impartial study of all aspects of color television since the current controversy over color TV began was available to the FCC in July as the Commission began executive sessions in an effort to bring forth a reasonably rapid decision from the mass of testimony, exhibits, briefs, and other material on the subject gathered over a period of upwards of a year.

A special committee of scientists, banded together by the Senate Interstate and Foreign Commerce Committee, and under the chairmanship of Dr. Edward U. Condon, who heads the Bureau of Standards, rendered a report July 11—the day the FCC's sessions began—which endeavored to lay out basic principles regarding color TV, operating characteristics of the three major systems, and general conclusions without selecting any of the systems as the one the FCC should approve.

Major conclusions of the committee were that: "a six-megacycle radio frequency channel is adequate for color television service, and represents a proper compromise between quality and and quantity of service; the three systems of color television herein described comprise all of the basic systems of color television which need be considered for a six-megacycle channel; and the three systems are mutually exclusive—one, and only one, of these systems must be chosen in advance of the inauguration of a public color television service."

Although the committee did not recommend which system—those of the Radio Corp. of America, Columbia Broadcasting System, and Color Television, Inc.—should be selected by the FCC, it did reach conclusions on the comparative performance of the three systems in various important categories.

The Condon group said that the CBS system is superior in color fidelity in large areas and in registration, and that its line-interlace method and RCA's are equally good in connection with continuity of motion of large objects. It said that RCA's effectiveness of channel utilization is superior to that of the other systems, and that the RCA and CTI systems are equally good in flicker-brightness relationship and geometric resolution, the latter relating to the number of picture elements per color picture.

The committee said that "Past experience, notably in Great Britain in 1936, with multiple standards of television transmission has proved that such action encourages a portion of the viewing public to purchase equipment which loses its value when the final decision is made among the multiple standards. The decision can be made, and should be made, on the basis of analyses and tests conducted prior to the inauguration of the public service. Moreover, these analyses and tests are well under way, and the final decision can be made without unwarranted delay."

Less fundamental but important matters "of great economic importance" relate to the transition from the existing black-and-white service to the future color service, the committee said. "The problems of this transitional period will endure so long as both black-and-white and color transmissions are available in a given locality, and this situation may continue in many populous areas for an indefinite period. Accordingly, the committee believes thtat the relative suitability of the color systems for public use must be judged, in part, in terms of their relation to the existing black-and-white service."

Presently available figures on the cost of receivers for each of the systems are not "indicative of the situation to be expected when manufacturers of receivers actually commence on a large scale," the committee said. "If, as seems probable, a tri-color tube is to be used in future receivers, no matter which system is adopted, the cost will be more equal . . . In view of the fact that a definite answer to the question of receiver costs cannot be available until the color service is actually instituted and large-scale production is under way, the committee believes that it will not be possible to take the relative receiver cost factors into consideration in arriving at the necessary policy affecting color television".

Prospects for future improvement are not equal in all three systems, the committee said, and this is a matter of "evident importance" in setting standards, "since the standards may be expected to be in use for a long time after their full potential has been realized."

The report went on, "It is the opinion of the committee that the CBS system has progressed furthest toward full realization of its potentialities, within the confines of the field sequential system. It is not likely, for example, that the color fidelity will improve beyond the highly satisfactory state now achieved. Equally, the CBS system is not likely to improve substantially its channel utilization beyond that achieved in the dot-interlaced version of the system. Nor is the flicker-brightness performance capable of substantial improvement, except by methods equally available to other systems, once the picture rate is established at 24 color pictures per second.

"The CTI system, being less fully developed, has somewhat greater possibility of future improvement, particularly with respect to correction of faulty registration and small area color distortions, and the development of convertible receiver circuits using a tri-color tube. But in other respects the CTI system cannot reasonably be expected to overcome certain inherent limitations imposed by the choice of scanning method. These include the difficulty of avoiding interline flicker and the impracticability of using dot interlace (at a color picture rate of five per second, which is too low for satisfactory rendition of small areas and sharp edges).

"The RCA system also has considerable opportunity for improvement within the confines of the scanning standard proposed for this system. The registration of the color images, and the balance of the color values in both large and small areas can be expected to improve substantially with advance in camera design. Convertible circuits, to convert existing sets to color, using the tri-color tube and auxiliary components, can be developed."

The committee, set up in May, 1949, has as members, in addition to Dr. Condon, Newbern Smith, of the Bureau of Standards, Stuart L. Bailey, president of the Institute of Radio Engineers, Dr. William L. Everitt, who heads the electrical engineering department of the University of Illinois and is also a member of the President's communications policy board, and Donald G. Fink, editor of Electronics.

Colonel George W. Goddard, photo lab chief for the Air Materiel Command, was the 1950 recipient of the Bane Award. See page 49, col. 3.

Pipe Line Electronic Control

A radically new method of controlling petroleum pipe line operations, made possible through developments in teletype techniques and electronic equipment, which through automatic controls will guide flow of oil products from four new stations with their control point in New York, 850 to 950 miles distant, was announced July 18 by the Shell Oil Co.

The new system, which has been placed into operation by the Shell company, was developed with the cooperation of the American Telephone & Telegraph Co., which perfected the teletype

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relay equipment necessary to carry communications from New York to the four stations; the General Electric Co., responsible for the switch gear, controls and accessory equipment at each station; and the Bailey Instrument Co., which provided the telemetering equipment, permitting reporting of oil and other fluid pressures and electrical loads across the teletype system.

The pipe line, for which the new control facilities were designed, is unique in that it is equipped to deliver up to 22 different finished petroleum products.

The new stations of the system, located at New Douglas, Effingham and Dennison, Ill., and North Salem, Ind., are controlled from New York City, at the Shell offices in the RCA Building, where certain number sequences are dialed on a regulation-type telephone dial.

In response to these numbers, the station being dialed starts or stops, reports its operating conditions or starts a siren, in case of emergency. These responses the Shell announcement said, are made within 45 seconds.

The Shell company central control office in New York City, through the new system, can, through the teletype directions sent to the stations, automatically regulate flow of various petroleum products and distribute these to different points along its pipe line. Controller at the New York station can tell at any time the amount of particular products flowing through the line and their exact location.

AIR FORCE

The role of the Airways and Air Communications Service is one of growing importance in the Korean campaign and is expected to be increasingly so as the U. S. forces set up additional airfields and later take over North Korean fields if pushes up the peninsula are successful.

As in World War II, the AACS moved promptly with advancing units so as to quickly set up communications facilities at captured airfields, establish control towers for combat aircraft and military air transport, as well as inter-airfield teletype facilities, messenger service, and code rooms.

With training in AACS having become more specialized in the last stages of the last war and in the postwar period, personnel of the service will take over increasingly important posts in radar operations, particularly in the airfield control towers, and in the operation of other "blind" flying apparatus.

Understandably, no estimates can be given of the number of AACS men now in Korea, but units of the service will, of course, be greatly increased as additional U. S. forces are thrown into the Korean campaign. A number of detachments of the service are now in Japan, and with establishment of any other "feeder" and attack bases for Korean operations, the units would necessarily increase with the growth of U. S. air power in that area.

Bailey AACS Operations Head

Colonel Wilbur W. Bailey was named in mid-July to be director of operations at AACS headquarters, Andrews Air Force Base, Washington, D. C. He replaced Lieutenant Colonel John Crawford who was rotating to the AACS Pacific Wing.

Colonel Bailey's new assignment followed 15 months of intensive high level command communications training with the American Telephone & Telegraph Co. A West Point graduate, he has a background of 11 years experience in the Signal Corps and in air communications. He has been with the Air Force since 1947.

Maude, Sandretto Named For Promotions

Two leading officers in Air Force communications, Brig. Gen. Raymond C. Maude and Col. Peter C. Sandretto, were recommended for promotion by President Truman the last week in July in a list of approximately 50 Air Force and Air Force reserve officers submitted to the Senate for affirmation. General Maude was nominated for the permanent rank of brigadier general and Colonel Sandretto, assistant technical director of the Federal Telecommunications Laboratories in Nutley, N. J., affiliated with the International Telephone & Telegraph Corp., was named to become a brigadier general in the U. S. Air Force Reserve.

General Maude, now serving as assistant director of requirements under the deputy chief of staff for development, started his career in military communications with the Signal Corps upon graduation from West Point in 1926 and served throughout the continental U. S. and in Hawaii before World War II.

During the war he was communications officer for several air commands, attaining, in 1945 the rank of communications officer of the U. S. Air Forces in Europe. Upon his return from Europe in 1947, General Maude became chief of staff of the Airways and Air Communications Service in Washington, D. C., and soon afterward transferred from the Signal Corps to the Air Force. He reached his present post shortly after graduation from the National War College several years ago.

Colonel Sandretto, currently on a two-week tour of duty at Air Force Headquarters for training, has a 20-year career in aeronautical radio development and operations, during which he wrote "Principles of Aeronautical Radio Engineering," a textbook used by the Navy during the war. Colonel Sandretto graduated from Purdue University in 1930, and after working a short while for Bell Telephone Laboratories, served 10 years in charge of United Airlines communications laboratories. His war record includes service as U. S. signals liaison officer with the Air Ministry in London, and as chief of electronics division of the directorate of communications for the Air Forces in the Central Pacific theater. In 1946, Col. Sandretto left the Air Force to join I.T.&T. and its subsidiaries.

Col Goddard Gets Bane Award

Colonel George W. Goddard, USAF, familiar to many AFCA chaptesr for his demonstrations of strip-film three-dimensional photography, recently received the Thurman H. Bane Award for 1950.

This award is presented annually by the Institute of Aeronautical Sciences to an officer or civilian of the Air Materiel Command for outstanding achievement in aeronautical development. Colonel Godard, chief of the photographic laboratory, engineering division, of the AMC, was selected this year for "his development of a new system of night aerial photography at low altitudes."

Colonel Goddard began work in 1945, at the photographic laboratory, on a new system for low-altitude night photography. A three camera system was developed, giving a vertical and two oblique pictures with moving film synchronization to compensate for ground image motion. Illumination comes from an ejected photoflash cartridige, which, by bursting 600 feet behind and 400 feet below the photographic airplane reduces the danger of the ship's illuminating itself as an enemy target. A photocell located below the belly of the aircraft picks up the light from the cartridge burst and signals the camera system to move fresh film into place after each picture. These three parts—the camera system, photocell, and cartridge discharger—are tied together electrically and controlled by suitable timing devices so that they operate automatically after control information such as altitude and aircraft speed are set in manually.

AU Orientation Course

The Air University, Maxwell AFB, Alabama has announced that the communication and electronic division, USAF special staff school, located at Gunter AFB, will initiate a fifteen day orientation course on October 6, 1950.

Colonel Harold W. Grant, director of the air communications and electronics staff officers' course stated that the orientation course is a compressed version of the twenty-two week course given to selected regular and EAD reserve officers of field grade. The course content will be stimulating and is designed to bring reserves up to date on current policy as well as cover briefly the new trends in equipment. It is anticipated that this course will be given in the Spring and Fall of each year.

In accordance with Air University policy, the students will critique the course at its conclusion. In the past the AU has used this device to fit courses to the needs of its students.

A quota of fifty has been set for the October course. Interested reserve officers of field grade holding communication-electronics SSN's should apply at once following the procedures described in AFR 45-48.

Personnel Changes

AACS personnel have been reassigned as follows:

Lieutenant Colonel Grover Willcox to the 540th Aircraft Warning Group. Stewart AFB, N. Y., after returning to the ZI from the 1804th AACS Group. Elmendorf AFB, Alaska.

Defense Needs Pointed Up By General Lawton Before War's Beginning

With the keynote that "we cannot rest but must now prepare to be so strong that a war will not start," Maj. Gen. irke B. Lawson, Deputy Chief Signal Officer, in an address April 20 before the New York Athletic Club presented a clear-cut picture of the present necessity for the expenditure of $13.5 billion on national defense, and how it was imperative to be fully prepared for national defense "to prevent a war or to win one if someone else attacks."

General Lawton emphasized the "events during the past 30 years should convince anyone that the Soviets do not intend merely to hold and consolidate their present position" and if they progress 200 miles westward and take the Ruhr their industrial strength will be increased two-fold. "We do not recommend war," General Lawton declared, "but we believe that a cowardly fear of war and a craven spirit of appeasement will lead to war rather than to peace."

The $13.5 billion for national defense in ratio to the national income only amounts to 5%, General Lawton stated. Of the Army's share of $4 billion, he declared that only 8% is for research and development and 8% for procurement of major items, and stressed that those two items will have a determining effect on the nation's future because "we must have more effective armament and greater quantities to win against our potential enemy."

The Army Signal Corps has about $25 million for research and development, General Lawton stated, and out of this fund it employs about 800 scientists and engineers and 1600 others to support the research and development activities at the Eastern Signal Center at Fort Monmouth, N. J., and also spends annually about $10 million on contracts with the best industrial laboratories and universities. About $2 million is used for basic research, General Lawton said, citing that there is a "desperate need for basic research." He pointed out that the new National Science Foundation approved by Congress will probably take over the Signal Corps" portion in basic research in the nine major research and development areas in which the Signal Corps has primary cognizance.

Since V-J Day, the Signal Corps has developed 20 new items of important communications equipment, General Lawton told his listeners. Some of these are: field wire with a plastic insulating cover requiring no critical rubber; field radio receivers, with a 15 mile range and with an arrangement of frequency band to permit organization of nets, which was not feasible always in the last war, and using only 10 crystals in comparison with 120 crystals in the old sets; the radio man pack set, which has been reduced to one-half former size and weight; and the handie-talkie radio set, which due to miniaturization of components, has more frequencies and longer operating hours with one to two-mile voice range.

General Lawton added that a radio-receiver-transmitter, the size of a large cigarette package, has been developed for voice communication with 100-yard range, which will be helpful for the infantryman in his foxhole to coordinate frontline efforts.

The microwave radio relay such as is being used by the communications companies in the United States, General Lawton said, is being adapted to military use as the answer to furnishing signal communications to rapid movements. Pointing to the efforts of Russia to blank out the Voice of America, he noted that communication has two disadvantages—the location of the transmitter can be determined by the enemy, and by radio counter-measures the signal can be blanked out. However, even though there is still much work left in the countermeasures field, General Lawton cited quotations from Dr. Vannevar Bush's recent book on how radar sights can be jammed in high altitude bombing planes, and radar-controlled antiaircraft artillery with advanced types of computers and proximity fuze shells can stop any fleet of bombers within its range.

In the telephone area, the Deputy Chief Signal Officer related that switchboards are being developed on the building block principle, so that by adding one unit serving 100 subscribers, additions can be made for several hundred. The standard teleprinter, he noted, has been reduced to half-size and half-weight for field use. All these equipments are units in an integrated signal communications system so that a theater commander, General Lawton cited, while visiting a forward unit can talk to the Pentagon, his voice traveling over radio, wire, coaxial cable, converters and relays, which must be maintained and operated.

Although the national defense establishment is spending millions for research and development, "it must be remembered that many items are developed which are beneficial to our people and our industry," General Lawton declared. Funds are not being used for research where private capital is available, such as television instruction to reserves through free-channel time by Columbia Broadcasting System.

The ever-increasing complicated electronic equipment requires trained technicians, General Lawton emphasized, and the Signal School of 6000 students is comparable in size to a college. After 4½ years of stockpiling critical materials, 53.7% of the dollar value of stockpile objectives will either be on hand or on order, General Lawton said.

Stressing that the Signal Corps has been aiming at the goal of efficient management and cost analysis as mandatory, General Lawton declared that "the so-called fat in budgets, which in reality were activities of low priority, has been eliminated and today we can assure you our house is in order."

—*Telecommunications Reports.*

Major Robert P. Locke to the 1806th AACS Group, Albrook AFB, Canal Zone, from Hq. AACS.

Major William Schuster to the 1928th AACS Squadron, MacDill AFB, Florida, from the 1804th AACS Group, Elmendorf AFB, Alaska.

Captain James T. Walker, to Hq. USAF Security Service, Brooks AFB, Texas, from Hq. AACS.

First Lieutenant Landis D. Henderson to Hq & Hq Sq, USAF, Office of the AAG, from Hq AACS.

T/Sergeant Sherwood A. Cadorette to the 8th Radio Sq, Brooks AFB, Texas, from Hq, AACS.

Corporal Ward C. Williamson to the 1807th AACS Wing, Wiesbaden, Germany, from Hq, AACS.

NAVY

Fleet CO Is Communicator

The commander of the Navy's 7th Fleet, which has been contributing so much to the maintenance of the supply lines of the United Nations' American and South Korean forces on the Korean peninsula, Vice Admiral Arthur Dewey Struble, is a former Naval communicator. During his Naval career he has served about five years in Naval communications assignments—from 1927-30 in the Office of the Chief of Naval Communications, and from 1934-36 as district communication officer of the important 12th Naval District at San Diego.

Vice Admiral Struble, who is one of the Navy's most experienced top-level officers in amphibious warfare, with a distinguished record in such assaults and landings in the Pacific and European theaters, uses a cruiser as his Fleet flagship, because of its extensive communications installations.

That Communications in Washington has been performing excellently could be observed from mention in a recent press dispatch that Admiral Forrest Sherman, Chief of Naval Operations, had radioed a "well done" to the officers and men who blew up a North Korean railroad tunnel.

There is no doubt, too, that the American and British fleets in the Korean waters are maintaining good communications contacts, which demonstrated the value of the joint maneuvers of the two Navies and the coordination work during and since the war by the Combined Chiefs of Staff communications groups.

Howeth NavCom Security Chief

In recent Naval communications command reassignments, Captain L. S. Howeth, USN, was named as head of the security branch, office of the Director of Naval Communications, in Washington, D. C. Captain Howeth has for the past year been communications officer on the staff of the commander of the Eastern Sea Frontier, and had previously been head of Naval Communications Operations and Planning Branch in Washington.

Communications Shifts

In another Naval Communications shift, Capt. W. B. Bailey, USN, formerly commanding officer of the Navy communication station of the 14th Naval District, was announced to fill in the vacancy left by Captain Howeth on the Eastern Sea Frontier staff.

Capt. J. A. Morrison, USN, was assigned as head of the equipment engineering section, Operations and Planning Branch of the Office of the Director of Naval Communications, relieving Commander C. A. Stay, USN, who was reassigned as electronics officer in Guam. Captain Morrison was formerly commanding officer of the Navy communications station of the 10th Naval District in San Juan, Puerto Rico.

Naval Lab Names Top Advisor

Dr. John M. Miller has been named as the top advisory consultant to the Naval Research Laboratory in the field

POWER

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Famous wartime reputation for service . . . still identifies Ray-O-Vac LEAK PROOFS!

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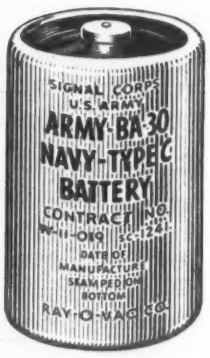

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. . . plus this guarantee: "If your flashlight is damaged by corrosion, leakage or swelling of this battery, send it to us with the batteries and we will give you FREE a new, comparable flashlight with batteries."

Now being made—the second billion!

RAY-O-VAC LEAK PROOF BATTERIES

of electronics research and development, it was announced in mid-July by Capt. F. R. Furth, director of the laboratory. Dr. Miller was named superintendent of Radio Division One of the laboratory.

Buck Made FCA Victor VP

Rear Adm. Walter A. Buck, who served as president of the Radiomarine Corp. of America and operating vice president of the RCA Victor Division after his retirement from 30 years of Navy duty, has been elected vice president and general manager of the Victor Division, it has been announced by Brig.. Gen. David Sarnoff, RCA Board Chairman. He succeeds the late John G. Wilson, who was executive vice president in charge of the Victor Division.

Admiral Buck served as president of the Radiomarine Corp. for nearly a year following his retirement from the Navy March 15, 1948.

FDR Skipper Get Ham Congrats

Captain William V. Davis, USN, received scores of radio congratulations from "hams" upon his assuming command of the Navy's supercarrier *USS Franklin D. Roosevelt*.

An ace "ham" operator, Captain Davis last November was signed up as the 1000th member of MARS, the Military Amatuer Radio System. So when his MARS fellow members learned of his new assignment they burned up the air waves wishing him "bon voyage." His call is A30SM/W30SM.

Captain Graham Retires

Captain Roy W. Graham, USN, chief of staff to the commander of the Eastern Sea Frontier, four times decorated during World War II for his outstanding service in the field of Naval communications retired June 30th after a thirty year career.

Captain Graham was at Pearl Harbor at the time of the sneak attack, and largely through his efforts there was no lapse of communications at any time during that disaster. Subsequently he served as commanding officer of one of the Navy's most modern communications ships, the *Mount McKinley*. In January 1945, when Admiral Nimitz's headquarters were moved to Guam Captain Graham was put in charge of the Army-Navy communications center there.

He has long been a familiar figure to the AFCA's New York Chapter, having been habitually active in the chapter's affairs, as well as in the work of the national association.

At the time of SIGNAL's going to press it was understood that Captain Graham had accepted a position with the Raytheon Corporation.

He has a master of science degree in radio communications from Yale University.

New 10th District Comm CO

In a formal military ceremony July 18 at San Juan, Puerto Rico, Captain Philip G. Stokes USN, relieved Lieutenant Commander J. M. Watson.

Signal Corps Research, Relations to Educational Institutions

(*Continued from page* 22)

It was therefore not until the early months of 1948 that positive action could be taken to recruit and hire junior physicists, chemists and engineers. Reductions in force having ended and with work load steadily increasing, a modest increase in civilian allotments was received early in 1948, making it possible to set aside a small number of positions specifically for young engineering and science graduates whose previous experience was represented only in their bachelor's degree.

As a start, in January 1948, four junior engineers were employed by our laboratories. They were the vanguard of young blood and represented only one-half of one per cent of the total professionals employed. By March 1949, the total rose to 84, which represents approximately nine per cent of the total professionals.

The junior engineer program is presently constituted along the lines of acquiring each year a group of young graduating personnel. Initially, these engineers will pass through a broad course of orientation and technical instruction so as to continuously bring out latent ability which will later assure proper assignment in the area for which the incumbent is most qualified and interested.

The broad policy of the program provides for the assimilation of the junior engineers into the various professional fields in the scientific research and development work of our laboratories, correlating the capabilities, interests and aptitudes of each junior engineer with work underway. The original appointment probational period and ultimate regular assignment is conducted under competitive conditions, with close technical supervision and objective evaluation of performance. The policy provides both the Laboratories and the junior engineers with the opportunity to explore appropriate work assignments and eventual placement possibilities, furnishing an on-the-job training period which becomes graduate professional experience.

In actual practice the program operates in the following manner:

(1) A group of positions over and above operating authorization is provided to permit a hiring program independent of the irregularities in the rate at which vacancies by attrition occur. This group of positions is regarded as a reservoir providing a constant supply of technically educated young people for selection and assignment to regular professional positions.

(2) Hiring to these positions is done from permanent Civil Service registers of qualified junior engineers and scientists as developed by competitive examinations. Those so appointed are in probational status for one year.

(3) Following reception and interview, they are assigned to the organizational segment of the laboratories which is most fitting to the interest and educational specialty of the new graduate.

(4) The immediate supervisor of the new employee is selected with as much care as the appointee, in order to insure his receiving competent leadership, introducing him to proper techniques in research and development, and acquainting him with Signal Corps procedures.

(5) A comprehensive report on each junior engineer is required at the end of the first three months in probational status. This report is designed to be a candid evaluation of the employee's performance, attitudes, aptitudes, and professional bent; it is to be a consensus of the opinions of his supervisor, branch chief and chief engineer of the particular laboratory, incorporating recommendations as to the desirability of assigning the junior engineer to a permanent position, reassigning him to another field, or terminating his employment.

Thus we hope systematically to acquire and assimilate the new graduate into our laboratories. As he grows in experience he must choose between a completely technical career or one of compromising his technical ambitions with administrative responsibilities. In either case he has great opportunity, initially in doing and perhaps later in guiding others—be it in conducting research investigations into some unknown field in the physical sciences, or perhaps in developing or designing a minute electro-mechanical brain to be rocket-projected into the upper atmosphere to describe what it "sees" to curious mortals on earth; or it may be a giant radar set atuned to a celestial body or a man-made object coming over the horizon; or perhaps a system by which countless men can communicate with exchange of words, pictures or complex data during battle even though thousands of miles apart—all of these things and many others remain for the young graduate, should his desire be for scientific work in the field of national defense.

I hope that my remarks have given you more of an insight into our program, into some of our difficulties, and the parts in which we have a strong mutual interest. The Signal Corps is deeply appreciative of the fine spirit of cooperation shown by the engineering colleges and universities in helping us in our research and in the ever-improved training new graduates are showing as they join our laboratories.

New RCA electron tube "freezes" movements that occur, and are ended, in millionths of a second!

How to "see" a super fine slice of time!

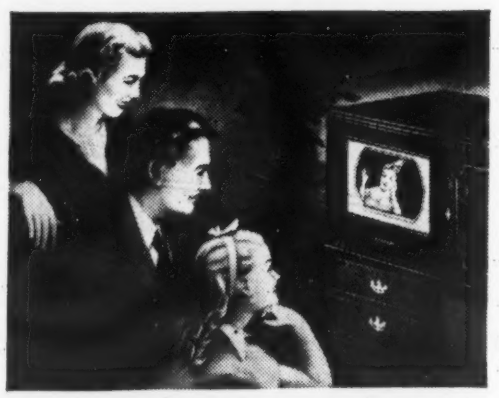
Now scientists at RCA Laboratories work with slivers of time too infinitesimal for most of us to imagine. Their new electron tube, the Graphechon, makes it possible.

For instance, in atomic research, a burst of nuclear energy may flare up and vanish in a *hundred-millionth* of a second. The Graphechon tube oscillograph takes the pattern of this burst from an electronic circuit, recreates it in a slow motion image. Scientists may then observe the pattern of the burst . . . measure its energy and duration.

With Graphechon we can watch fleeting phenomena which occur outside our control. It is not only applied to nuclear research, but also to studies of electrical current . . . or in new uses of radar and television. Like so many products of RCA research Graphechon widens man's horizons.

* * *

See the latest wonders of radio, television, and electronics at RCA Exhibition Hall, 36 West 49th St., N. Y. Admission is free. Radio Corporation of America, Radio City, N. Y. 20.



Research like that which gave us the Graphechon tube accounts for the superiority of RCA Victor's new 1950 home television receivers.

RADIO CORPORATION of AMERICA

World Leader in Radio — First in Television

USN as commanding officer, Naval communications, in that area. Commander Watson had been acting commanding officer since the departure of Captain J. A. Morrison who was detached June 20th.

Captain Stokes' new command includes the Naval communications station San Juan (Stop 7½), Martin Pena and Carolina in the San Juan area, as well as Naval communications in Guantanamo, Trinidad, and Roosevelt Roads.

In addition to his primary duty as communications CO, Captain Stokes is district communications officer on the staff of Rear Admiral Daniel Barbey, commandant of the Tenth Naval District. His previous assignment was professor of naval science at the University of Illinois. He is a graduate of the U. S. Naval Academy class of 1928.

Six Navy Communicators Enrolled In War Colleges

Six captains in Naval Communications were enrolled during August in senior staff and command courses in the Naval War College, National War College, and the Industrial College of the Armed Forces.

Captain P. R. Anderson, USN, and Captain Frank Virden, USN, both graduates of the Navy's postgraduate course in applied communications, were enrolled in the senior course of the Naval War College which started August 10. At the National War College in the class commencing August 28 Naval Communications were represented by Captains G. R. Donaho, L. H. Frost, and W. R. Lord. In a class also starting August 28 at the Industrial College of the Armed Forces was Captain George F. O'Keefe who has been head of the administrative branch of the division of Naval Communications since March 1949.

Formal ceremony at San Juan, Puerto Rico, marks change of Navy communications command. Story page 52, col. 3.

COAST GUARD

Rhodes Replaces McKay As Chief, CG Communications

Captain Earl K. Rhodes, who is now commander of the U. S. Coast Guard vessel Northwind, an important Coast Guard vessel in the North Atlantic, will become the new Chief of Coast Guard communications on Oct. 1, succeeding Capt. Donald E. McKay, who has been Chief of Coast Guard communications for the past four years. Captain Rhodes had been Assistant Chief of Communications for three years, from 1946 to 1948.

Regarded most highly for his abilities and knowledge in the communications field, and one of the key government officials in international radio conference preparations, Captain McKay was detached from his post as Chief of the Coast Guard communications on Aug. 15, and will become the Director of the Coast Guard Reserve for the 12th District at San Francisco on Sept. 1. However, Captain McKay may not serve for long on the Pacific Coast as he is certain to be a member of the U. S. delegation at the Extraordinary Radio Administrative Conference, slated to start at The Hague Sept. 25 unless disrupted by the international situation. The retiring Chief of Coast Guard Communications, who had a notable World War II record in the amphibious operations in the Pacific, is considered exceptionally well qualified to serve at the Hague conference.

There is some consideration being given to the postponement of the Radio Conference at The Hague, but that issue has not been definitely decided. Captain McKay, while his command on the West Coast would have important aspects of enrolling and training Coast Guard communications personnel as well as in other Coast Guard activities, would in all probability be shifted to another major Coast Guard assignment where his communications abilities would be most valuable to the Coast Guard, if the parley is not held.

The new Chief of Communications of the Coast Guard, Captain Rhodes, who graduated from the Coast Guard Academy in 1928, has had practically all of his service in communications since 1937, except for two tours of sea duty. He was assigned to the Coast Guard District Office in Chicago in communications from 1937-40; was on duty with the Army Signal Corps from 1940-42; and served in the communications division of the Coast Guard headquarters in Washington from 1942-44. He took over the command of the USS Northwind in late 1948.

Captain McKay, who graduated from the Coast Guard Academy in January, 1927, during World War II, was executive officer on the USS Arthur Middleton for 14 months while that ship participated in the initial landings and capture of Tarawa, Kwajalein, Eniwetok, Saipan and the landing on Leyte, P. I. He also served as the commanding officer of the *USS Cepheus* during the occupation of Sasebo and Kure, Japan. Prior to that he had been executive officer of the *USS Leonard Wood*, when that ship was engaged in amphibious training operations on the Atlantic Coast, and as part of a convoy carrying British troops from Halifax to Bombay, and when that vessel became the flagship of the Atlantic Fleet Transport. He served as personnel officer of the 8th Coast Guard District for approximately a year during which period the personnel strength of the district increased from about 5500 to more than 13,000.

Except for the war period, Captain McKay has specialized in communications during most of his Coast Guard career. He had two tours of duty at Coast Guard Headquarters in the communications division from 1930-32 and 1937-40, together with acting as communications aide to the Secretary of the Treasury from 1937-41. For a short period when it was established in 1945, he was designated communications specialist to the chief of air-sea rescue office. He rejoined the communications division in January, 1946; became the division acting chief Aug.1, 1946 and chief of the division Dec. 2, 1946.

During his service with the communications division as chief, Captain McKay has been serving as the Treasury (Coast Guard) member of the Interdepartmental Radio Advisory Committee; the Frequency Allocation Committee of the Joint Combined Communications Boards; the Radio Propagation Council; and the Radio Technical Commission for Aeronautics, where he was a member of the executive committee. He has been serving as an alternate on the Telecommunications Coordinating Committee and as alternate on the Radio Technical Commission for Marine Services and its executive committee. He attended the Atlantic City World Telecommunications and Radio Conference in 1947, and has been a key official in the preparation of the United States both for that conference and the Inter-American Conferences and the Safety-at-Sea (London) and Aeronautical (Geneva) Conferences. He was a member of the U. S. delegation to the five-power preliminary telecommunications conferences in Moscow in September, 1946. Captain McKay had just recently been elected a director of the AFCA Washington (D. C.) chapter.

Both Captains McKay and Rhodes were promoted to that rank under date of March 20, 1945.

FOR

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The Type 24 Dial is a compact, high-speed impulsing device, accurately adjusted to transmit 10 impulses per second by means of a pair of impulse springs. Impulses may momentarily close an open circuit, or interrupt a normally closed circuit. To control auxiliary circuit operations, dial may be equipped with "shunt" springs in various arrangements.

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ARMY SIGNAL CORPS

Advisory Group Meets

A thorough analysis and review of the procurement program and plans for electronics-communications equipment and overall electronics-communications requirements of the Signal Corps, with emphasis on the objective of insuring the most effective and rapid production of apparatus, were conducted at a two-day meeting August 1, 2, at the Pentagon by a newly organized Signal Corps advisory group.

The group of distinguished industrial leaders met at the request of the Chief Signal Officer, Major General Spencer B. Akin, who was the chief participant of the Signal Corps in the conferences. The members of the group participating in the two-day meeting (*all of whom are leaders in AFCA activities*) were:

Major General William H. Harrison, IT&T president (*recently named to Commerce Department as chief of materials control*); Brigadier General David Sarnoff, RCA board chairman; Brigadier General Carroll O. Bickelhaupt, vice president and secretary of AT&T; Frederick R. Lack, Western Electric vice president and chairman of the electronics industry advisory committee to the Munitions Board; Colonel W. W. Watts, RCA vice president; and William J. Halligan, president of Hallicrafters.

The advisory group expressed satisfaction, it was said, with the Signal Corps plans for procurement and its organizational setup to accomplish the tasks and goals. Many constructive suggestions were offered by the group's members, and the industry leaders were also cited as having been wholly objective in presenting their views on matters where they felt weaknesses might exist.

It is planned for the advisory group to hold later meetings, possibly at frequent intervals, to consider progress and to present constructive criticisms and suggestions as may be timely.

Other leading Signal Corps officers who were in attendance at the advisory group's session were: Maj. Gen. Kirke B. Lawton, Brig. Gen. Alfred M. Shearer, Brig. Gen. Wesley T. Guest, Col. Victor Conrad, Col. Edwin R. Petzing, Col. Albert J. Mandelbaum, Col. Charles S. Stodter, Col. William Pence, and Col. Francis T. Kidwell.

Zanuck Confers With Akin On War Film Increased Need

Colonel Darryl F. Zanuck, vice president in charge of production for Twentieth Century-Fox Corporation, AFCA life member and former vice president of the Association, came to Washington August 14th for a conference with Major General Spencer B. Akin, Chief Signal Officer, on the Army's increasing wartime film needs.

During World War II Colonel Zanuck served as photographic advisor to the Chief Signal Officer. In this capacity he went on several overseas missions, bringing back outstanding coverage of combat in the Aleutians and North Africa. He was awarded the Legion of Merit for his services.

With the beginning of hostilities in the invasion of South Korea, and the threat of similar Communistic aggression elsewhere in the world, bringing a partial mobilization of U. S. strength, Army films to speed the training of large numbers of men have again had to be rapidly increased. As the demand further increases, Hollywood and other commerical facilities will be required to help meet it, as was the case in World War II. It was in connection with such problems almost certain to arise, that Colonel Zanuck conferred with General Akin.

The conference of photographic matters followed the recent formation of a Signal Corps advisory council to assist in solving industrial problems in the field of communications-electronics-photography. Colonel Zanuck had been unable to attend the initial meeting of the council.

Meanwhile announcement was made that the Signal Corps is planning to resume a World War II type of training at its Long Island photographic center, designed to turn out additional combat teams of both still and motion picture cameramen to reinforce those already in service. It is anticipated that Signal Corps reservists with photographic qualifications will be needed to fill these assignments.

SC Man Gets First Purple Heart Award In Korea Fight

The first Purple Heart award in the Korean conflict was made to a Signal Corps soldier, Sergeant Leroy Deans, who was on duty at the time of his being wounded with the Korean Military Advisory Group in Seoul.

Major General Edgar E. Hume, Far East Command surgeon, made the award in the presence of the Honorable Kim Young Joo, head of the Korean Diplomatic Mission to Japan.

Bridge Named For SC Man

A bridge near Rockville, Maryland, was dedicated August 12th as a memorial to Corporal John C. Brown, Signal Corps, who was the first Maryland soldier killed in action in Korea.

Civilian Resources Study

A civilian personnel resources committee has been established in the Office of the Chief Signal Officer to advise the CSO on availability of required personnel. It will also recommend action designed to maintain and supply adequate and qualified civilian employees to meet current and future manpower requirements at all installations, under staff and command authority of the Chief Signal Officer.

Brig. Gen. C. O. Bickelhaupt, vice president of IT&T and of the AFCA, presents AFCA Medal to Cadet Wilbur J. Jensen, outstanding cadet of the Fort Monmouth summer encampment. Looking on is Monmouth's CG, Maj. Gen. Francis H. Lanahan.

Turkish Officers At Monmouth

Three Turkish Signal Officers are presently studying U. S. Army Signal Corps techniques and procedures at the Fort Monmouth Signal School.

All three officers, Captains Mithat Akkurt, Ihsan Tezeren, and Lieutenant Lufti Sal are natives of Istanbul, Turkey, and all are graduates of the Signal School at Ankara and of the Turkish War School, the Turkish equivalent of our Military Academy at West Point.

SC Anti Sabotage Film

An Army training film made by the Signal Corps, "Guarding Against Sabotage," is now being made available to industrial firms. The film depicts how attempts to destroy industrial facilities may be combatted.

Prints may be borrowed from the Signal Officer of the Army area in which the borrower is located. Requests should be addressed, depending on the location, to Signal Officers at Governors Island, N. Y.; Fort Meade, Md.; Fort McPherson, Ga.; Fort Sam Houston, Tex.; Fifth Army headquarters at Chicago; Presidio of San Francisco; or the Military District of Washington, D. C.

PERSONNEL CHANGES

Conrad Heads Communications

Colonel Victor A. Conrad has assumed duties as chief, Army communications service division, replacing Brig-

adier General Wesley T. Guest. General Guest is chief, signal plans and operations division, Office of the Chief Signal Officer, having taken over that position upon the transfer of Brigadier General Rex V. D. Corput to chief signal officer of the European Command.

Colonel Conrad served in the European Theater during World War II and commanded the Signal Corps Engineering Laboratories, Fort Monmouth, from July 1945 to October 1946. Later he was signal officer, Philippines-Ryukyus Command. From July 1949 until he assumed his present duties he was one of the permanent Army members of the Joint Communications-Electronics Committee.

Clark To Far East

Grigadier General Carter W. Clark, chief of the Army Security Agency, was reassigned to the Far East Command about the first of July.

New Chief, Still Pic Branch

Major John S. Bardwell, formerly executive for administration at the Signal Corps Photographic Center, Long Island City, New York, has assumed duties as chief of the still picture branch, Army Pictorial Service Division, OCSigO.

The chief of the Photographic Center at Long Island, Wallace W. Lindsay, was recently promoted to the rank of colonel.

Committee Replacements

D. S. Miller, engineering and technical division, OCSigO, has been designated as Army associate member on the panel on Arctic environment of the committee on geophysics and geography, Research and Development Board. He replaces *Wilton W. Smith* on the panel.

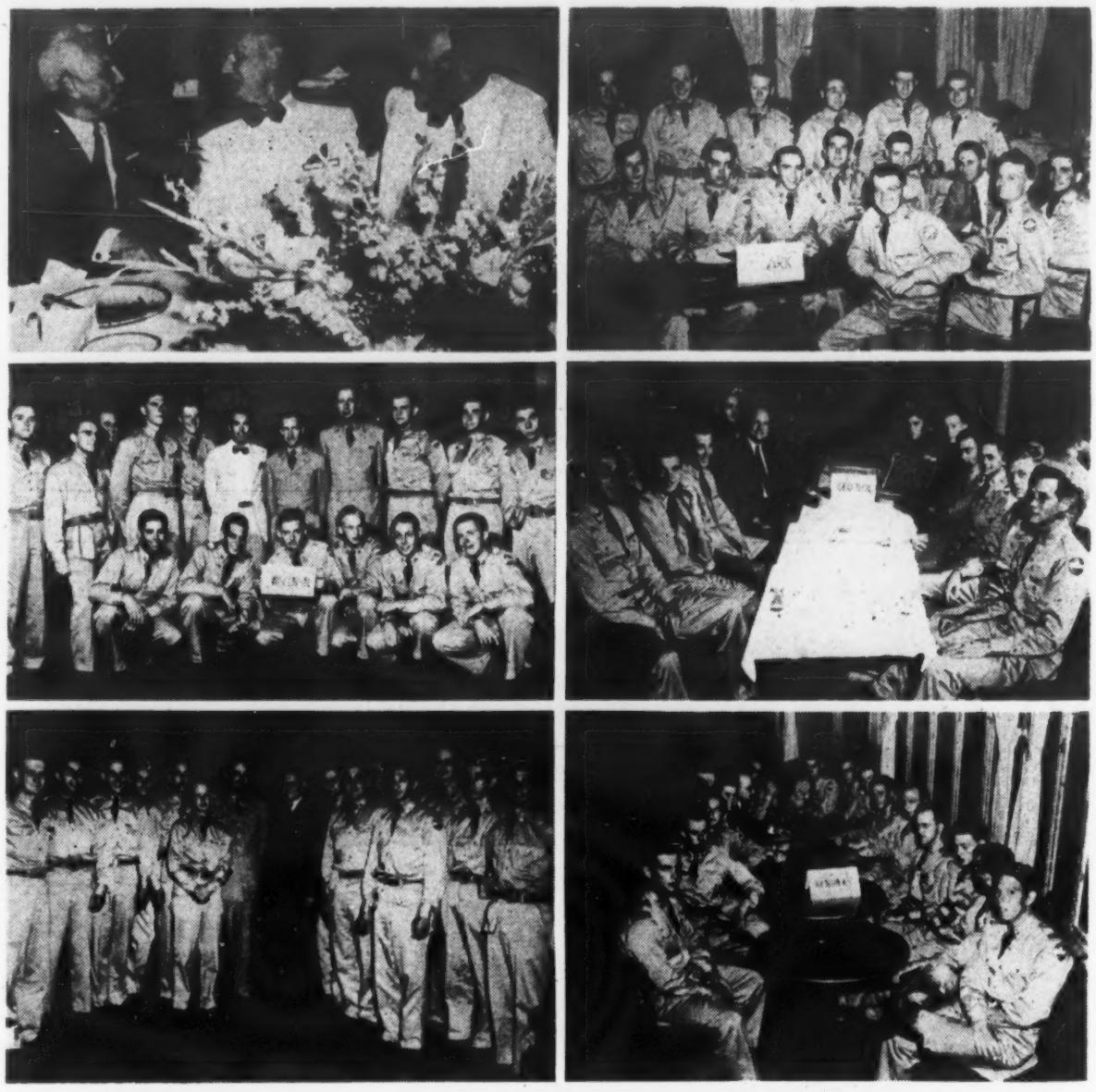
Lieutenant Colonel Clarence R. Dunlap has been designated a member from the engineering and technical division, OCSigO, on the Signal Corps munitions and commercial commodity control committee. He replaces *Major Oscar B. Kusterman* on the committee.

Robert K. Fox of the OCSigO has been designated as an Army member on the panel on test equipment, committee on electronics, Research and Development Board. He replaces *Park L. Bedford*.

Power Film Exec On Duty

William A. F. Pyle, industrial manager of the Delaware Power & Light Co., Wilmington, and a lieutenant colonel in the Signal Corps Reserve, was on active duty in July in the OCSigO.

Colonel Pyle held important supply posts during World War II at the Lexington Signal Depot and in GHQ of the Southwest Pacific Theater of Operations.



ROTC Fort Monmouth summer encampment. Upper left, head table at dinner given for visiting school presidents. L to R: Dr. Wilson Compton of Washington State College; Monmouth CG, Maj. Gen. F. H. Lanahan; Dr. Blake R. Van Leer of Georgia Tech. School groups in other photos are, L to R, top to bottom: Arkansas, Wisconsin, Georgia, Minnesota, and Kentucky.

Changes —

Colonels:

W. Preston Corderman, Alaskan Command to Alaskan Communications System; *Walter C. Ellis*, Valley Forge GH to retirement 31 May '50; *Houston V. Evans*, Student ICAF to Office of Assistant Chief of Staff. *Marion Van Voorst*, Office of Assistant Chief of Staff, G-1, to Career Management Branch, AGO, Washington, D. C.; *Harry L. Vitzthum*, commanding officer, Sacramento Signal Depot, to assistant chief of procurement and distribution division, OCSigO (about Nov. 1); *Floyd T. Gillespie*, European Command, will replace Col Vitzthum in Sacramento; *Harold T. Gallagher*, commanding officer, Signal Corps stock control agency, Philadelphia, to commanding officer, Lexington Signal Depot (replacing *Colonel William M. Mack*, who will go overseas); *Glen S. Meader*, European Command, will replace Colonel Gallagher in Philadelphia; *Frank J. Schall*, European Command, to signal section, Atlanta General Depot; *Benjamin Stern*, commanding officer, Signal Corps Procurement Agency, Philadelphia, to Headquarters, Second Army; *John L. Autrey*, Hq. I Corps, to Hq. Eighth Army; *Haskell H. Cleaves*, student detachment, Command and General Staff College, to European Command; *Amory V. Eliot*, Marianas-Bonins Command, to Signal Corps Center, Fort Monmouth; *Richard B. Moran*, Fourth Army signal officer, to retirement; *Murray D. Harris*, commanding officer, Baltimore Signal Depot, to European Command; *A. H. Anderson*, signal officer, USA Carribbean, Hqs, Panama Canal Zone, to replace Col. Harris at Baltimore.

(*In a later report it was understood that Colonel Anderson would remain in the Canal Zone.*

Officers recently promoted to the temporary rank of colonel: Francis C. Bowen, Edmund T. Bullock, Dominick J. Calidonna, James Corr, Jr., James Dreyfus, Wallace W. Lindsay, Robert H. McAteer, Glenn S. Meader, Francis N. Miller, Ralph T. Nelson, Thomas A. Pitcher, Clifford A. Poutre, William W. Sturdy, and Stuart M. Welsh.

Lieutenant Colonels:

Samuel P. Collins, to Colonel, Army Security Agency; *Thomas M. Hahn*, to Colonel, USA Caribbean; *Henry J. Hort*, to Colonel, SCTC Camp Gordon, Ga.; *Paul O. Langguth*, to Colonel, OMA, London, England; *Alfred R. Marcy*, to Colonel, V. Corps; *John V. Mills*, to Colonel, USAG, Greece; *Marlin S. Moody*, to Colonel, Hqs, EUCOM; *Harold F. Osborne*, to Colonel, 441 MI CIC Det.; *James N. Purcell*, to Colonel,

Signal School, Fort Monmouth, *Clyde R. Smith*, to Colonel, Hqs 3rd Army; *Wilbert A. Speir*, to Colonel, Far East Command; *William L. Bayer*, to Colonel, Joint Staff, Joint Chiefs of Staff.

James D. DeMarr to engineering and technical division, OCSigO; *George F. Rogers* to Army communications service division, OCSigO; *Roscoe C. Huggins* to procurement and distribution division, OCSigO; *James R. Crank* to P&D division following completion of the course at the Command and General Staff College.

Other OCSigO Assignments:

Major Bernard A. Ferry to chief, executive branch, engineering and technical division, OCSigO; *Major Andrew J. Burch* to procurement and distributinon division (after more than four years in the EUCOM, latest assignment there being assistant chief of the procurement and distribution division in the signal division of EUCOM Hq); *Major Charles W. Flint* to P&D division, OCSigO; *Captain George A. Kurkjian* to career management branch, OCSigO; *Captain Harry S. Maffett* to P&D division, OCSigO; *First Lieutenant James F. Thornley* to administrative office, OCSigO; *First Lieutenant Alfred E. Ganschow* to Army communications service division, OCSigO; *Warrant Officer (JG) Thomas H. Swindler* to career management branch, personnel and training division, OCSigO.

Industrial College
Fort McNair, Washington, D. C.

Entering classes begun late in August: Colonels Francis C. Bowen, William D. Hamlin, and Walter B. Larew. Lieutenant Colonels Wayne O. Jefferson, and Herbert L. Scofield.

Adjacent page; Field scenes at Fort Monmouth ROTC summer encampment showing cadets receiving instructions in communications and photography.

National War College
Fort McNair, Washington, D. C.

Entering class begun in August: Lieutenant Colonel Albert F. Cassevant (commanding officer of one of the engineering laboratories at Fort Monmouth).

Civilian Universities:

Entering classes this fall: Lieutenant Colonels Olin L. Bell, Maynard C. Raney; Majors Jack R. Carpenter. James L. Clark; Captains Jacob B. Cooperhouse, William L. Holcomb. Neely M. Swomley; First Lieutenants John S. Baumgartner, Russell B. Jones. Jr., William T. Lincoln.

Manufacture of Copperweld Wire

(*Continued from page* 18)

This inspection is made whether the wire is shipped as solid wire or whether it is stranded into Copperweld or Copperweld-Copper Cables.

Every coil of Copperweld wire is tested at each end and all wire not meeting all the minimum requirements is rejected. The rigid inspection has been a benefit to Copperweld as well as to the users. Many people say, "Why go to all this detail to make copper-covered steel wire?" The answer is. "We are sold on it." We have experimented with plated coatings and found them unable to withstand anywhere near the abuse that Copperweld can take. End corrosion, for example, would be serious on a plated wire but is of no consequence on Copperweld.

Nicking and flattening should be avoided on any wire but wire made by the molten welding process has far more tolerance against these abuses than a plated wire would have.

Improvements in practice have been written into the specification as they are made and the result has been a definite improvement in quality over the years. Such improvements as a guaranteed minimum copper thickness have made it possible to assure the same life as copper under similar conditions of exposure and corrosion.

Haloid Products Serve the World

(*Continued from page* 27)

rolls off. The result is a mirror-reversed positive image of the original subject or copy. This corresponds to the developed negative in silver-emulsion photography and takes only a few seconds.

The next step is making a permanent print from the developed image. This is done by laying a piece of paper over the powdered plate and charging the paper with the same electronic device used to sensitize the plate. The powder particles relinquish their affinity for the plate and are attracted to the charged paper. By this transfer, the image is restored to its true left-right relationship and is a direct positive reproduction of the original subject. At this stage of the process, the print corresponds to the chemically developed silver-emulsion print before it is fused in hypo. This step takes 8 to 10 seconds.

Making the image permanent is accomplished by heating the paper print for a few seconds in a heating platen. Heat melts the powder granules and fuses them to the paper. The prints are as permanent as the material on which the image is applied.

If the developing powder is black. and the paper upon which the print is

(*Continued on page* 64, *col.* 1)

Supplement to Cable Operations, Wartime France

(*Continued from page* 25)

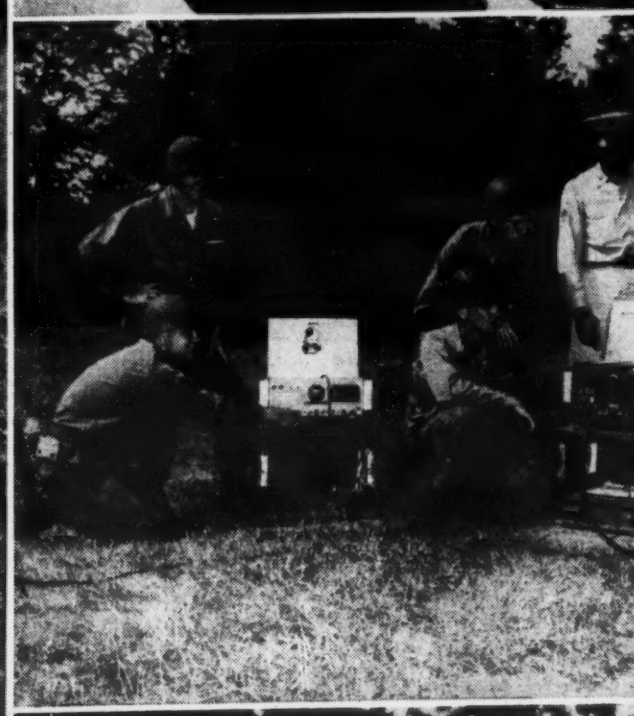
Lyon-Marseille circuit was established. to be followed by a multitude of others, both military & civilian. Shortly after the two sectors in France were joined. the first Marseille-Paris military circuit became a reality. These circuits would never pass muster from a transmission engineer's standpoint. They were full of echo, due to the low-velocity loading used, and the deviation was considerable, due to many reasons, particularly the French habit of changing repeater gains for no good reason. but they talked and they talked good. Later, an American repeater & VF telegraph station was established at the PTT building in Marseille, under the aegis of Delta Base Section, which replaced Con Base even before the first. circuit was turned up.

A number of other things were done by the Army in Southern France to rebuild the cable network. The cable to Toulon, Cannes and Nice, also pretty badly damaged, with a missing repeater station at Toulon, was repaired and placed in service not long after the landings. This cable later enabled the R & R boys to keep in touch with their headquarters. A 37 quad cable, loaded H-88-50, was placed from Marseille. through the barge tunnel and on to Arles, to provide communication to a rapidly growing series of military communities in that neighborhood.

The cable leading up the Arc into Italy from Lyon was repeatered at Modane and went thru the railroad tunnel at that point (Mt. St. Cenis) to Bardonnecchia and on to Torino. The station at Modane was completely gutted and the tunnel had been mined and partially destroyed. In order to connect Southern France and Delta Base with Pen Base, a 19 quad cable was laid across the top of the Alps to connect Modane with the Italian cable at Susa. This cable was loaded H88-50 and an American repeater station was established at Modane. The cable itself was jute protected, but it was necessary to place it aerially, since it could not be buried in that rocky country. This posed some problems, which were overcome and the cable was strung and most of the work done by Slav labor service units, under the jurisdiction of U. S. Signal Corps personnel.

Later, with the help of the French. circuits were added to Montpellier and Sete, and, even later, to Toulouse, Bordeaux and Biarritz.

I hope I have not become too verbose. but reading this article brought back a lot of memories, most of them pleasant, of the fight waged by members of the U. S. Army Signal Corps to provide good, fast communication between Base section supply points and the Armies and installations ahead. Sometimes I hope the British P. O. will see fit to publish some of the experiences of their fine personnel on duty with the British Signals in Sicily and Italy, who repaired the Palermo-Rome cable and cables north of Rome. This would also make interesting reading.



Later Changes Received

Lieutenant Colonel John V. Mills, chief signal officer on the staff of Lieutenant General James A. VanFleet, head of the military mission in Greece, has been promoted to colonel.

Lieutenant Colonel Clarence M. Jennings has been designated chief, policy and plans branch, Army communications service division, OCSigO.

Major John A, Gahr has been designated acting commanding officer, Army command and administrative agency.

The following SigCorps officers will report in September as students at the Army War College, Fort Leavenworth, Kansas: *Lieutenant Colonel Charles H. Burch*, office of the chief of staff; *Lieutenant Colonel Stuart S. Hoff*, office of the chief of Army field forces; and *Lieutenant Colonel John C. Monahan*, OCSigO.

ROTC

Monmouth ROTC Ceremony

Army commissions to forty Signal Corps cadets were awarded July 27th at the final review of the reserve officers training corps encampment at Fort Monmouth, N. J. Major General Francis H. Lanahan, post commanding general and ROTC camp commander, presented second lieutenant bars to thirty-nine reserve officers and a regular Army commission to Herbert Fincher of Wedowee, Ala., to highlight closing ceremonies of the 1950 encampment which had been in full swing for the previous six weeks.

With General Lanahan as reviewing officer 550 cadets paraded in his honor and other notable guests, on hand to assist in the presentation of awards as a befitting climax to a successful program in specialized communications represented by thirty-six colleges and universities throughout the country.

Distinguished visitors included Maj. Gen. William H. Harrison, president of IT&T; Maj. Gen. Harry C. Ingles (ret.), president of RCA Communications, and wartime Chief Signal Officer; Maj. Gen. George L. Van Deusen (ret.), president of RCA Communications, and former Fort Monmouth commander; Maj. Gen. Joseph O. Mauborgne (ret.); Brig. Gen. Carroll O. Bickelhaupt, vice president of AT&T; and Colonel George P. Dixon, executive secretary, Armed Forces Communications Association.

During the impressive retreat ceremonies three separate awards and decorations were made, along with ORC commissions. Cadet Wilbur J. Jensen, an undergraduate at Rutgers University, was selected as the outstanding cadet of the summer encampment.

He was honored in serving as commander of troops during the parade, and he was the recipient of the Armed Forces Communication Association Medal. This award, made annually to the cadet most outstanding in communications, was presented by Colonel James D. O'Connell, president of the AFCA chapter at Fort Monmouth.

With the ceremonies marking the end of the encampment, most of the cadets departed homeward bound. A select few were to remain at Fort Monmouth for a few weeks as employees of the Signal Corps Engineering Laboratories.

RESERVES

Reserves Study ComCenter

Members of the 804th Signal Base Depot Company, an ORC affiliated unit commanded by Colonel Edward C. Cover, recently studied the operations of the Army Communication Center in the Pentagon. The Reservists received a guided tour from Signal Corps personnel who operate the center.

The 804th, affiliated with the Chesapeake and Potomac Telephone Company, was alerted for active duty early in August. If called to active duty the company would be part of a signal base depot group in a general depot.

The company's commanding officer, Colonel Cover, is secretary-treasurer of the AFCA Washington Chapter. (*See Chapter News, this issue*).

ORC To Get Armories

A ten million dollar armory construction program has been announced by the Department of the Army designed to provide training space for Army reserves in 21 states. The program is part of the Department of Defense plan to train and equip officers and enlisted men of the organized reserve corps. Construction will be supervised by the Corps of Engineers on federally owned land under jurisdiction of the Army, or on land upon which the Government holds long-term rights. Four new armories are to be acquired by purchase of existing buildings and facilities.

Optical Eye of the Signal Corps

(*Continued from page* 9)

nation of Signal Corps photographic activities is vested in the Chief, Army Pictorial Service Division. Assisting the Chief of the Division is the Photo Administrative Branch and the Still Picture and Motion Picture Branches.

Maintenance of files of still pictures made by Signal Corps Photographers throughout the world is an operational responsibility of the Still Picture Branch. As pictures are received they are evaluated for disposition in any one of five separate files. Today, more than half a million still pictures, covering more than 2,000 different categories are available to the public from the photographic library.

By far the biggest file, and increasing all the time, is the permanent library with more than 300,000 pictures. It is here that all Signal Corps photographs having a permanent reference or historical value are placed. Pictures selected for this file are cloth mounted, 8 x 10 inch enlargements, bound into books each with a capacity of 100 prints.

Maintaining its own up-to-date laboratories for the processing of black and white color materials, the Still Picture Branch performs general photographic functions for various army agencies located within the Military District of Washington. President Truman's favorite portrait was made by Signal Corps photographers working under the Still Picture Branch.

The Signal Corps biggest photographic responsibility is the production and distribution of motion pictures used in military training and information and education programs.

The focal point for these operations is the Signal Corps Photographic Center in Long Island City, New York. Here in the largest and best equipped studio east of Hollywood, a staff of 68 officers, 175 enlisted men and 750 civilians are continually engaged in making, to quote the words of Dr. Charles Hoban, Jr., of Catholic University, "the best instructional motion pictures in the world."

Enormous progress has been made by the Signal Corps in producing training films since the first experiment along those lines in 1916 when "Close Order Drill" was produced at West Point. From a very modest beginning, the Signal Corps has progressed to a point where it now produces more than 100 new training films a year.

But it wasn't always that way. In the Army's lean years after World War I the Signal Corps could lay claim to a total of only 155 subjects produced up to 1 January 1942. Pearl Harbor was the climax of a generation of national complacency under which our fighting forces found themselves submerged. Expansion of the armed forces during World War II brought many pressing training problems. From little or no equipment, the armed forces emerged with a vast array of mechanical appliances and new or improved weapons of war. The problem then was how to take the average American citizen and train him to use these latest technological developments within the shortest possible time. The one educational medium that promised to have the most profound influence on the problem was exploitation of the sound motion picture as an aid in military learning.

The rapid acceleration of the Army's training program in 1942 was accompanied by a corresponding increase in the production, distribution and use of training films. In the first year of war the Signal Corps teamed with the motion picture industry to produce 474

subjects. In one year alone the Signal Corps had produced over 300 percent more films than had been made in an entire generation. When you consider the factors involved in the production of a single motion picture you begin to realize the enormous effort expended to produce this total.

Through the combined facilities of the Signal Corps and the motion picture industry, the total production during four years of concentrated effort was the remarkable contribution to training of more than 2,000 films and almost an equal number of film strips.

Producing Army films today is a continuous process for the Signal Corps. The introduction of new doctrines, changes in techniques and practices call for new films and constant revision of those films that have become outmoded. Actual footage produced by the Photographic Center exceeds that of any one of the major studios. In an average year the laboratories at the Center will process 18 million feet of negative material and about 30 million feet of prints. What do all these figures mean in terms of human effort and dollar expenditure?

Production Figures

It takes the combined services of a 400-man production crew in one year to make from scratch about 150 training films that will each average about 28 minutes in actual running time on the screen. A very conservative estimate of time spent to produce this average film would be in the neighborhood of 500 man hours per minute of actual running time. Some films may be slightly less, the majority are likely to be more.

Production costs will be around $1,000 per minute of showing time. To this must be added the cost of making 150 duplicate 16mm prints at $28 a print, if black and white. Duplicate color prints will cost three times as much. The cost of world wide distribution of this film will be about $2,000.

The sum total of human effort and dollar expenditures for producing all Army films will run into a sizable figure. A study of the number of films in the Army film catalogue will reveal the tremendous investment in the motion picture as a training aid for the soldier. There is no question that this investment has paid big dividends for the Army by providing common doctrine and promoting a clearer understanding of the part each individual must play in the Army, whether we are at war or at peace. Today we recognize the sound motion picture as a very powerful medium for the presentation of an idea, or for gaining knowledge and experience, through the seeing and hearing senses. Films also increase the effectiveness and scope of expression because they are capable of portraying an unlimited variety of subjects. The motion picture will continue in the future, as it has in the past, to broaden

The Signal Corps made its first motion pictures in recording the flight of the Wright Brothers at Fort Myer in 1909. (Story page 5)

the soldier's experience to make him a more effective member of a coherent national fighting team.

The best made article in the world will not succeed unless effective measures are taken for adequate distribution and utilization of that product. The distribution of entertainment films in civilian life is a vast and intricate business. Just as important, where Army training is concerned, is the distribution of training films and their effective use in the hands of troops.

Training film distribution is accomplished through an Army wide system of 110 Signal Corps Film Libraries. Seventy-seven (77) of these libraries are in the Zone of Interior, the rest are scattered throughout the world. Film subjects given general distribution are duplicated in hundreds of copies, usually as 16mm prints and allocated according to troop needs. These prints are then shipped by the fastest available means to key points designated as central libraries which may have operational control of as many as 15 sub-libraries.

Training Aid Value

The main function of each film library is to render the maximum service to troops in the use of training films and audio visual equipment as effective aids in military training programs for the promotion of combat readiness of field units.

The Army keeps close watch over the use of its celluloid training aid. Quarterly reports are required from all film libraries on the use of films. As a result the Army has fairly accurate figures which reflect the use of the motion picture as a training aid. For example, in the three months covering the first quarter of 1949, there was a total of 169,267 16mm prints in 110 film libraries that were shown 279,650 times for total attendance figures of 21,984,848. Recognition at the box office of films used to help promote combat readiness, is the only reward the Signal Corps asks for its efforts. In the final analysis, supreme satisfaction only comes in the knowledge that the film helps to make the individual a better soldier, or is instrumental in saving his life because he absorbed the lessons it taught.

Any attempt to gaze into the crystal ball to see what the future holds for photography will show blurred images that only faintly resemble the photographic aspects to which we've been accustomed in the past. Gradually the fog of the future will clear and we will see the camera in a different form playing an ever important part in shaping our daily activities.

Future applications of photography for expressing the ideas and facts recorded by the camera will be directed more and more through electronic channels of communication.

Increased TV Use

The television, as the camera's electronic brother, already holds promise of being an impact on society with consequences as far reaching as the atom bomb. Even if the bomb is outlawed and the atom diverted to industry, television will march alongside atomic energy to record the progress of civilization in an atomic age.

Just as the camera has met the educational and informational needs of the Army in the past so will the Army find more uses for television in performing the same functions in the future. Significant steps in this direction are now being taken in the educational field. Modern visual aid instruction is only beginning to reach full developments through use of television in training. Studies based on actual tests are now being conducted to determine the effectiveness of television as a training aid.

Other applications involving the common employment of the camera and television in the communication of vital intelligence and information, will be made available to all branches of the service.

The recipient of two "Oscars" for producing outstanding motion pictures, the Signal Corps will continue to carry out its photographic mission and gather new honors in displaying the same pioneering spirit that prompted it to use the camera to record the ideas, facts and events of 87 years of military progress.

THE LORRAINE CAMPAIGN. By Dr. Hugh M. Cole, Office of the Chief of Military History, Department of the Army. 657 pages. $10.

Based on official American and German records, *The Lorraine Campaign* is the story of operations of General George S. Patton's Third Army in the fall of 1944 against the German forces defending the territory between the Moselle River and the Siegfried line. From the seemingly inexhaustible aspects of the campaign narrated in this volume, no one can fail to see what the soldier's war was like.

The narrative begins with the situation on September 1st 1944, when the Third U. S. Army had just completed one of the most successful operations in modern military history. Flushed with the success rolled up during the pursuit, the armored and infantry divisions of General Patton's army entered upon operations in Lorraine with an extraordinary spirit of optimism.

This optimism began to vanish, however, during the first days of the campaign when a gasoline drought struck and left Patton's mobile columns paralyzed.

Fortunately during this paralysis, the enemy was in no position to counterattack; unfortunately, however, this brief lull in operations gave the German forces an opportunity to recuperate. By the time Third Army was able to resume operations, it encountered a revitalized German force under orders from Hitler to "stand and hold."

The operations that followed became characteristic of the fighting in the three and a half month campaign in Lorraine and, in contrast to the pursuit pace of earlier operations, followed the "punch and probe" technique.

Villages and fortresses in the path of advance had to be assaulted with frontal and bludgeoning tactics that slowed movement down to an "infantry pace." Snow, rain, cold, fog, overcast, and mud conspired to hamper the American advance, which sometimes seemed unbearably slow to those who took part. Directly in the path of the Third Army also lay the redoubtable fortress of Metz, the Maginot Line, and the Siegfried Line, and an enemy whose tenactiy increased with each American advance on German soil.

By the time the campaign ended on December 18th, Third Army had wrested from the enemy 5,000 square miles of territory and denied the Germans the use of the Saar industrial region. Although the campaign lacked the dash and brilliant successes of earlier Third Army operations, it gained a new reputation for Patton's Army. Its ability to fight a foot-slogging battle, punch its way across heavily defended river lines, and to fight pitched tank battles was to stand Third Army in good stead when it intervened in the Ardennes.

Major roles during the campaign were played by the 4th, 6th, 7th, 10th, and 12th Armored Divisions and the 5th, 26th, 35th, 79th, 80th, 87th, 90th, and 95th Infantry Divisions.

For those who believe that "history is something that never happened, written by someone who was not there," Dr. Cole's book will be refreshing. The author is a veteran of the campaign having served with Third Army as official historian. Dr. Cole brought to his assignment several years of teaching military history at the University of Chicago plus graduation from the Army's Command and General Staff College. Long a student of military history, he has enriched his narrative with historical parallels whenever appropriate and with maps that wit satisfy the most discriminating map readers.

The Lorraine Campaign launches a nine-volume history on the American armies in the European Theater of Operations, and is part of the comprehensive 90-odd volume history. The U. S. Army In World War II, being prepared by civilian historians of the Office of the Chief of Military History. Earlier combat volumes covered Guadalcanal and Okinawa.

HIGH-FIDELITY TECHNIQUES. By James R. Langham. Randcraft Publications, Inc. 112 pages. $1.

The author says about his book. "Once upon a time the term 'high fidelity' meant having a volume control on your phonograph. . . That was a long time ago. Since the phrase was first coined it has been applied to each and every new development in the audio line. Naturally the term has become so overworked that now folks tend to smirk a little when they mention it. They put it in quotes and generally leer when they say it, so you'll know they're trying to be funny.

"That's all very well, but it's still a good term and it still has a serious meaning. To me high fidelity means as faithful reproduction as I can manage with my ear and my pocketbook.

"The trouble is that it's all subjective. It's not cut and dried. You want to hear what you want to hear, and you wouldn't necessarily be satisfied with what I want to hear. High fidelity audio is a nebulous thing and unpredictable beyond a certain point.

"If you are rich you can hire technicians by the carload to make your outfit what you want it to be. If you aren't—well, that's where this book comes in.

"This book is to help you get what you want. It isn't an engineering textbook. It is written strictly as I talk when a technician asks me for help on a certain point. I hope it reads easily and that it tells you what you want to know. The book is as close as I can come to writing the answers just the way I've discovered them. If you become further informed on some of the items you don't know as much about

National Best Sellers

Compiled on a percentage Basis from the Reports of 66 Booksellers as listed in Publishers' Weekly for August 15

FICTION

1.	The Cardinal, *by Henry Morton Robinson*	$3.50,	$1.00
2.	World Enough and Time, *by Robert Penn Warren*		$3.50
3.	Jubilee Trial, *by Gwen Bristow*		$3.00
4.	The Wall, *by John Hersey*		$4.00
5.	The Legacy, *by Nevil Shute*		$3.00
6.	Star Money, *by Kathleen Winsor*		$3.00
7.	Homeward Borne, *by Ruth Chatterton*	$3.00,	$1.00
8.	The Egyptian, *by Mika Waltari*		$3.75
9.	The Stubborn Heart, *by Frank G. Slaughter*		$3.00
10.	Too Little Love, *by Robert Henriques*		$3.75

NONFICTION

1.	Roosevelt in Retrospect, *by John Gunther*	$3.75
2.	Worlds in Collision, *by Immanuael Velikovsky*	$4.50
3.	The Mature Mind, *by H. A. Overstreet*	$2.95
4.	Courtroom, *by Quentin Reynolds*	$3.75
5.	John Adams and the American Revolution, *by Catherine Dringer Bowen*	$5.00
6.	The Little Princesses, *by Marion Crawford*	$3.50
7.	Look Younger, Live Longer, *by Gayelord Hauser*	$3.00
8.	Dianetics, *by L. Ron Hubbard*	$4.00
9.	The Grand Alliance, *by Winston S. Churchill*	$6.00
10.	Eleanor of Aquitaine and the Four Kings, *by Amy Kelly*	$5.00

as I do—well, you're just that much ahead. If you go further and build yourself an outfit that you'll get a big kick out of, we'll both be happy."

SOMME OFFENSIVE. Office of the Chief of Military History, Department of the Army. 921 pages. $4.75.

Somme Offensive is Volume 7 in the Army's documentary history series, The U. S. Army in the World War, 1917-1919. The documents consist primarily of battle instructions, field orders, operations reports, and intelligence summaries.

The Somme Offensive, one of the five major Allied offensives of 1918, got underway on August 8 with three Allied armies taking part. The 27th and 30th Divisions of the American II Corps entered the Somme Offensive as part of the British Fourth Army which was to deliver the main blow. Operating under the orders of the Australian Corps, the Americans took up positions west of the Hindenburg Line. The respective objectives of the two American divisions were strongly fortified towns of Bony and Bellicourt.

The Germans relied to a great extent on the network of heavily-wired trenches and strong points of the Hindenburg Line to stop the Allied advance. On the 29th of September the Americans and Australians broke through the Line and by evening had control of all the dominating crests. By October 5th the Allies in the Somme area were in open country east of the Hindenburg Line. News of the cracking of this hard shell of German resistance swept through the Allied world as a harbinger of victory.

CIRCUITS IN ELECTRICAL ENGINEERING. By Charles R. Vail. Prentice-Hall, Inc. 560 pages. $7.65.

The branch of the engineering profession known as electrical engineering enters into every form of industry and public service in which power is utilized, intelligence is transmitted, and precise control is exercised over physical, chemical, or mechanical operations. Electrical engineering is concerned with the generation, transmission, distribution, and utilization of electric power; with communications, embracing telegraphy, telephony, radio, television, and radar; with illumination; with electric transportation; and with industrial processes and their control.

Although some of these activities require a more detailed technical knowledge than others, all require a grasp in common of certain basic scientific principles. The object of this book is to present those electrical principles which may be considered basic to nearly all phases of electrical engineering activity.

TV INSTALLATION TECHNIQUES. By Samuel L. Marshall. John F. Rider Publisher, Inc. 336 pages. $3.60.

This book has been written for the TV installer—the person in whose power it is to make even the best receiver perform miserably, or operate in a manner that brings joy to all concerned. It has been written to help the installer make the best possible installations, resulting in the least number of callbacks.

A successful installation means lower costs, higher profits, and savings in valuable time. All these can be achieved in your TV installation activities by using this completely practical "how-to-do" book.

TWO BRITISH BOOKS

We have received two British published books which though not likely of general interest do contain matter which should be of considerable interest in the particular field with which each deals. One of these is: INTER-ALLIED CONFERENCES ON WAR MEDICINE. Staples Press, Inc. 531 pages. $5. This may sound technically formidable to the layman, and yet there is much of the content which should be of interest to any reader. There are personal accounts of experiences in assaults and other battle action, and of war-prisoner life which makes anything but dull reading. The other publication is: SEA SLANG OF THE TWENTIETH CENTURY. By Wilfred Granville. The Philosophical Library. 271 pages. $3.75. This should be interesting to U.S. Navy personnel —to see how the British Navy says it.

INSIGNIA OF THE ASSOCIATION

AVAILABLE TO MEMBERS FROM THE SERVICE DEPARTMENT

The insignia of the Association in several beautiful designs and convenient styles authorized for wear by members is available at the prices quoted below. Order from A.F.C.A. Service Department, 1624 Eye St., N. W., Washington 6, D. C. The insignia is described as follows:

The central figure is an alert powerful American eagle with strong talons clutching lightning flashes--symbolic of a strong America and national defense—especially insofar as modern communications is concerned, our basic reason for existence. The border consists of leaves of the olive branch of peace, showing that the object of military preparedness in America is to assure a lasting peace. In the background are signal flags—the first means of signalling in sea and land warfare by United States forces. Just above the eagle and between his outstretched wings is a heavy bomber in flight, symbolizing the complicated and essential communications in the Air Force, and in Naval and Marine aviation. Above that is a radar antenna array, and at the very top a radio relay antenna—for the latest major step in military communications. And none of these could exist without industry—the foundation of AFCA. In the color version there are the traditional colors of the signal flags—dexter white with red center and sinister red with white center—with a gold border to the whole.

LAPEL BUTTON FOR CIVILIAN WEAR

Bronze	$1.50 (including tax)
Sterling	2.50 (including tax)
10-K Gold	5.00 (including tax)

Specify whether signal flags should be in red and white enamel or plain.

MEMBERSHIP CERTIFICATES

Printed on fine diploma paper with the Association emblem in full color and the member's name engrossed.
Price $1.50.

BINDER FOR SIGNALS

Red Leatherette with Gilt Lettering

The magazines can be placed in the binder easily, in a few minutes. Each binder holds one volume of SIGNALS (issues for 1 year). This handsome, stoutly constructed, durable, imitation leather cover will preserve your magazines permanently. Th name of the publication and the year of the issues contained therein will be stamped on the back of each binder.

Binders for previous years can be obtained at the same price. When ordering binders be sure to state the years desired.

EACH BINDER—PRICE $2.

Our Book Department can furnish, in limited quantity, any book currently in print. We will also help you to secure older titles that you may need to complete your library. A 10% discount is allowed all Association members on orders of $2.50 or more except for technical books. Please indicate author and publisher where known, and allow at least three weeks for procurement and delivery. (We will place orders also for any overseas or isolated station reader of SIGNALS, but without the discount if not a member.)

HALOID PRODUCTS

(*Continued from page* 58)

made is white, the print will be black and white. One-color prints can be made directly by using developing powder that has been dyed the desired color. Multi-color prints can be made by combination prints, using separate plate images for each color.

Since the material on which the final print is made is merely a surface to receive the powder image, almost any type of paper may be used as printing paper.

Pilot production and field testing of a compact unit known as the XeroX Copier Model A is now in progress. With this unit copies may be made in sizes up to 8½" x 13". It is expected that these units will be available to government agencies and industry in the near future.

Further research on xerography for military purposes is being conducted by Haloid and Battelle organizations for the USAF Materiel Command, Dayton, Ohio.

Haloid's organization totals approximately 700 people. More than twenty-five per cent have been with the company ten years or more. Fourteen sales and service branch offices are located in principal cities throughout the United States.

Officers of The Haloid Company are: Joseph R. Wilson, Chairman of the Board; Joseph C. Wilson, President; Homer A. Piper, Vice-President; John B. Harnett, Vice-President; John Dessauer, Vice-President; Harold S. Kuhns, Secretary, Treasurer and Controller.

TIMES FACSIMILE

(*Continued from page* 24)

neering and development of additional types of facsimile equipment.

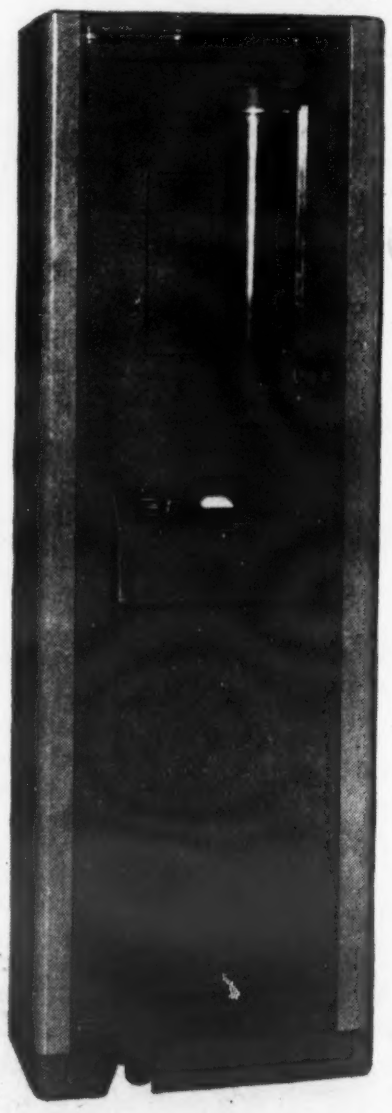
One machine which is in the final stages of development is an 18" continuous recorder. From this continuous recorder the weather maps will feed out on a continuous sheet of paper 18" wide and any practical length.

A message type of transceiver of a new design will soon be ready for field test. This transceiver is designed to handle 8½" x 11" message copy. The time of transmission for a full size sheet will be 11 minutes when operating over slow communication channels. 5½ minute transmissions can be made on faster channels that will pass up to 2400 cycles with little phase distortion. A switch permits operation at either speed. At the slower speed the transceiver will work into the FX-1 transceiver.

Times Facsimile is developing equipment for the transmission of X-Ray films. Its use will be between small hospitals and large centers where the films are interpreted. Its military uses probably will be very valuable because small field units may have the services of the best radiologists located at central points.

Two of the transmitters are now in operation, one at Chester County Hospital at West Chester, Pa., and one at Atlantic City. The transmissions are made to Philadelphia where the films are interpreted by one of the leading radiologists who conceived the plan while serving as a Navy medical officer during the war. The facsimile system makes it unnecessary for the radiologist to travel to the hospitals or wait for the films to arrive by mail.

Facsimile transmitter which will transmit a 14" x 17" X-Ray film in 4½ minutes. (Story, page 23).



One advantage of facsimile for message communications in military operations lies in the fact that the equipment can be operated with personnel who have had but a few hours of training. In some cases only a few minutes is required. The requirement for months of training needed by operators of other types of communications equipment is not a factor in planning a communication system employing facsimile. Times Facsimile not only supplies equipment for military uses but is also a supplier of facsimile equipment to The Associated Press, RCAC, Mackay Radio and foreign markets.

The Russians recently took pride in announcing the opening of a radiophoto circuit between Shanghai and Moscow. They failed to announce, however, that the facsimile equipment was manufactured by Times Facsimile Corporation. Moscow was supplied equipment on lend-lease and the Shanghai equipment was liberated from the Nationalists.

With the improvements in equipment design, wireline circuits, and radio circuits, facsimile is at last beginning to realize its potentialities. The advantages of "automatic" transmission of messages and the capability of sending graphic and pictorial material of all kinds, insure a place for facsimile in the forefront of the communications industry. The greatest progress in facsimile communications has been made in this country because of the support given by the armed forces.

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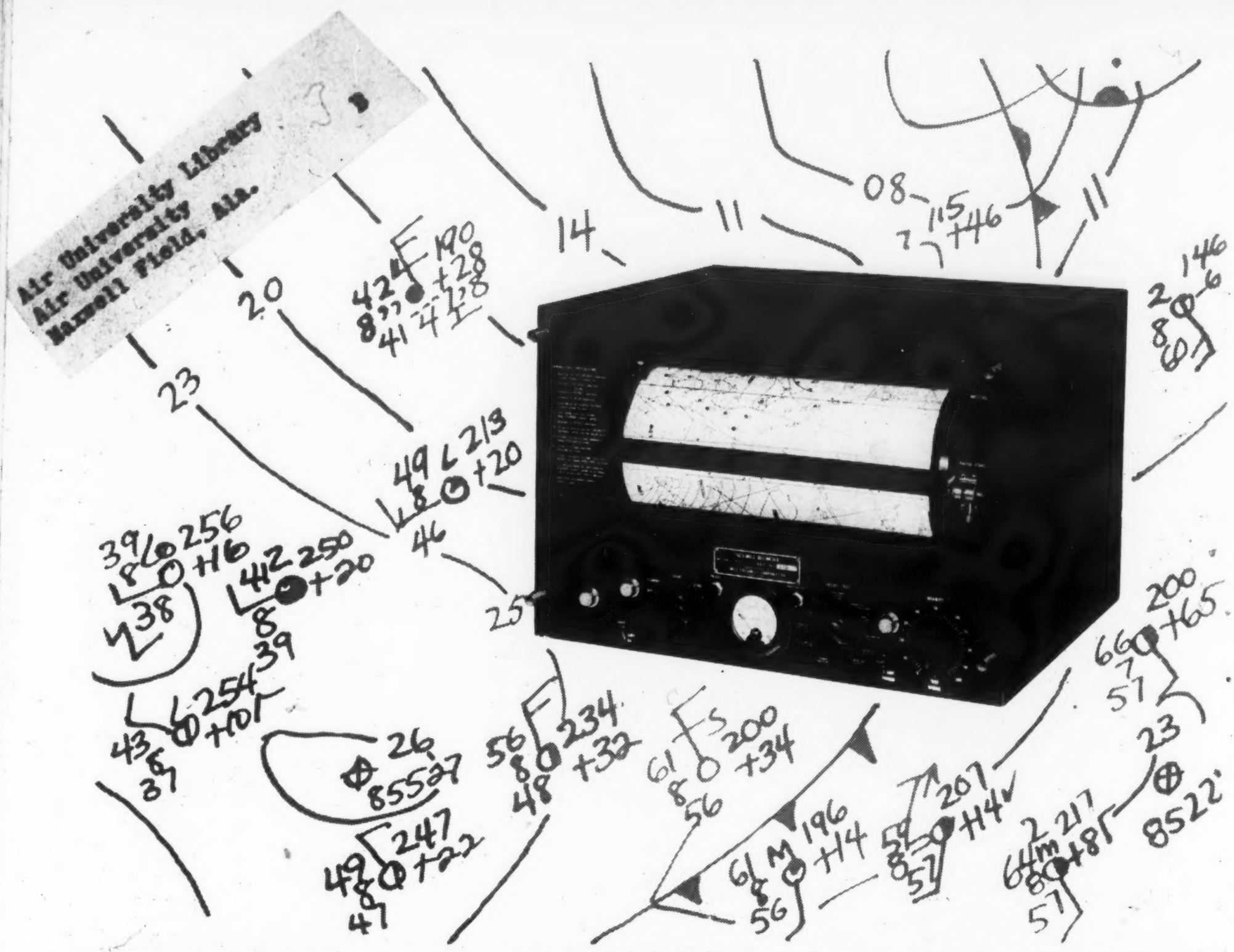

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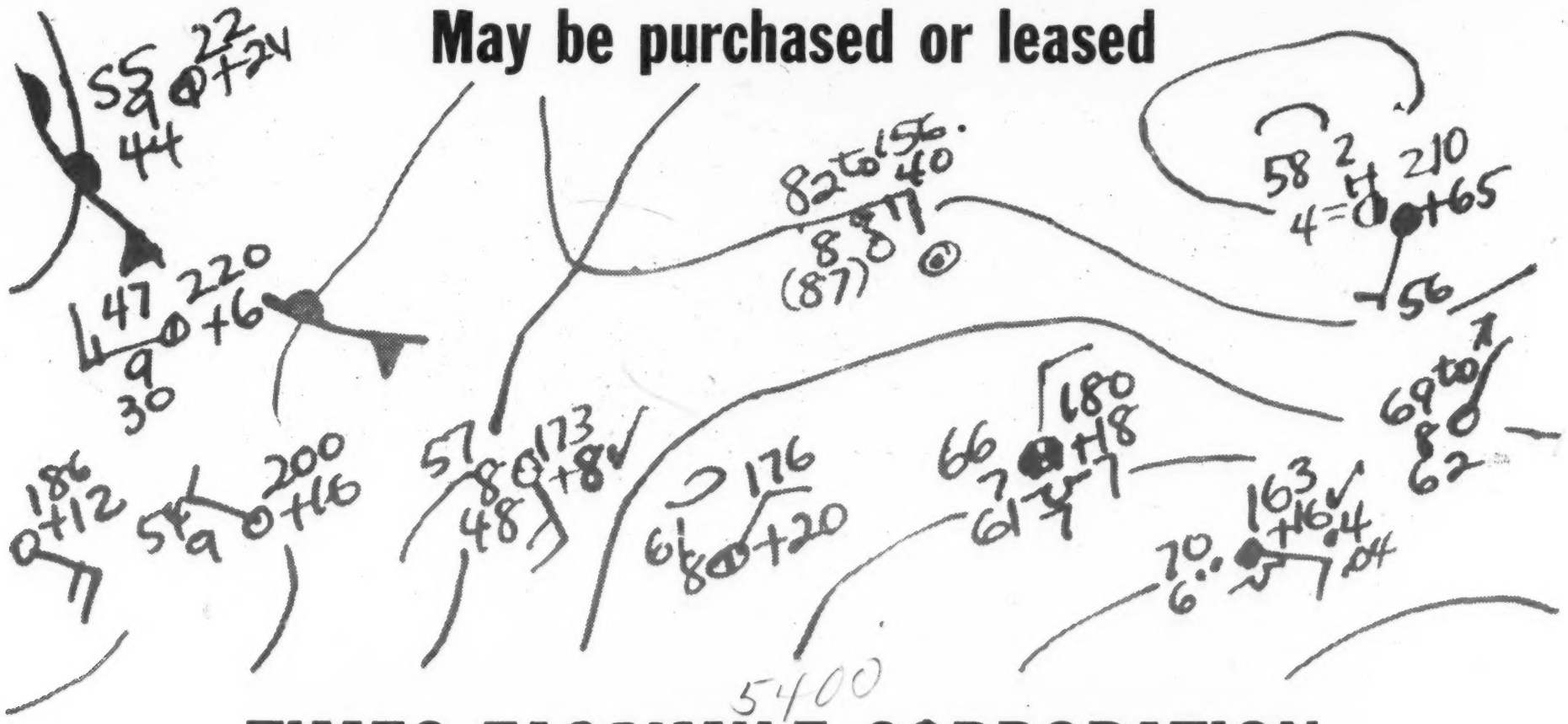

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